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THE IRON TRADE REVIEW

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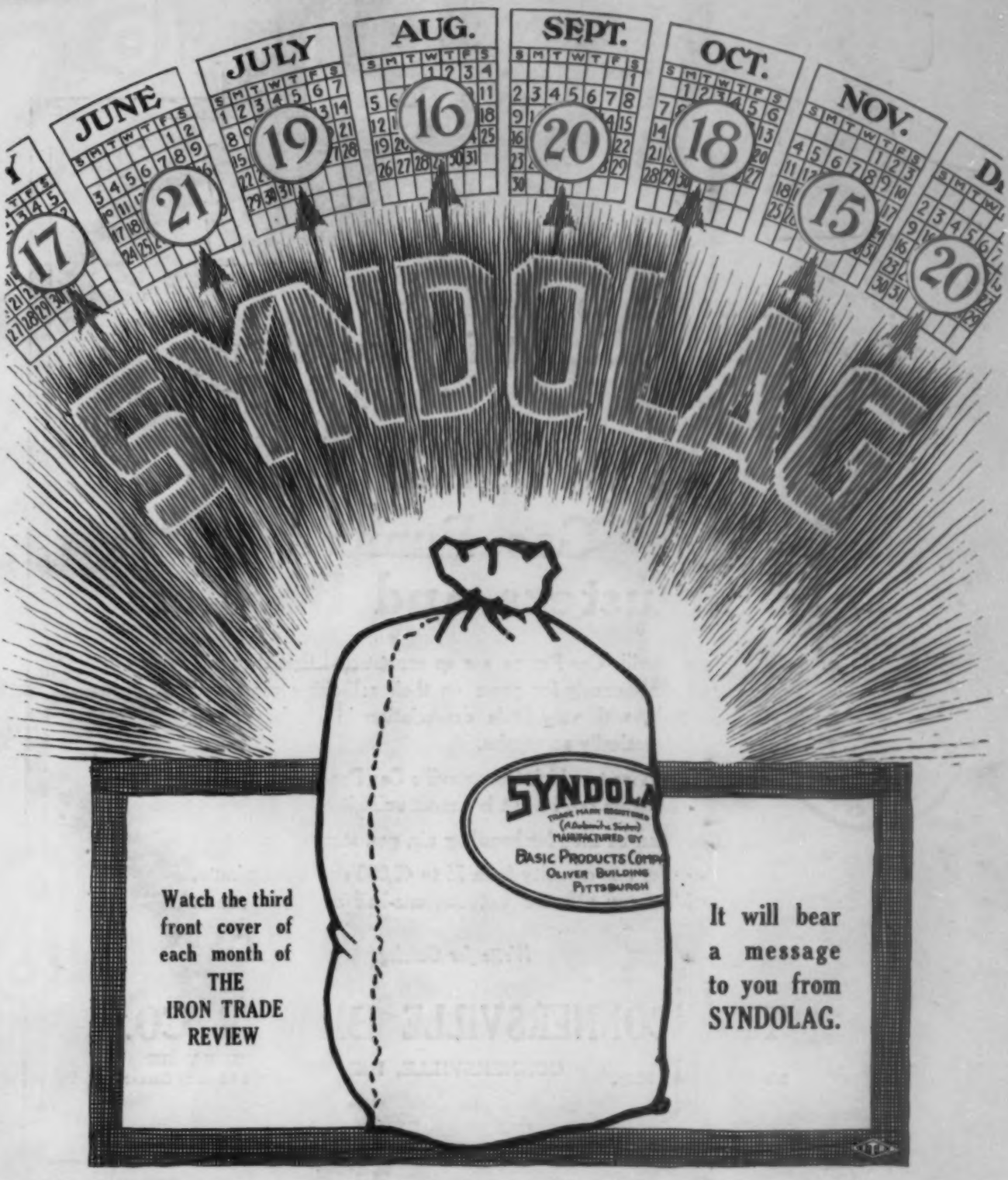

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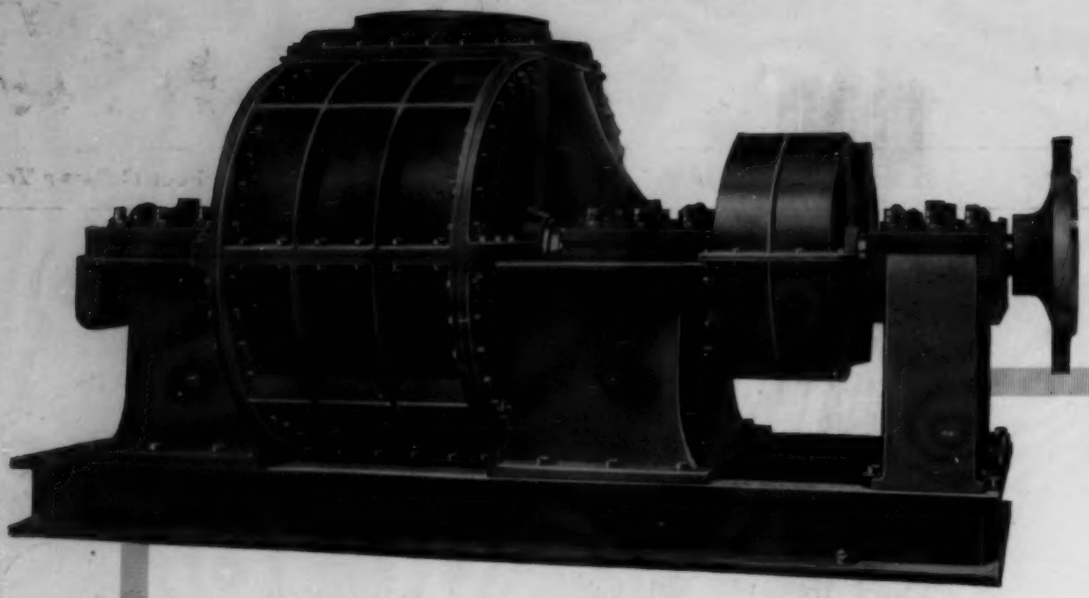

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CONNERSVILLE, IND.

NEW YORK
114 Liberty Street

THE IRON TRADE REVIEW

Vol. LX Cleveland, May 17, 1917 No. 20

Ship Program is Looming Large

Main Reliance Placed Upon Steel Makers to Carry Through Government's Tremendous Enterprise—Two Years' Plate Supply Needed—Federal Control More Far Reaching—Continuing Pig Iron Rise Causes Thought

WAR NEEDS in steel are piling up at a tremendous rate as the government unfolds its plans for a supreme effort of preparation and aggression. In a corresponding degree, new business of a non-war character is being set aside and tonnage already booked is being placed in a more uncertain position, either as to time of manufacture or of delivery. Federal direction of production, distribution and transportation is becoming more far reaching. In this, complete accord is being demonstrated by the nation's premier industry. Concentration of all buying for the allied powers under a single authority at Washington is a proposal looking toward greater market control.

Much Steel for Ships

The large part that the steel industry is expected to fill in the immense ship building program of the government becomes more apparent as the shaping of these plans proceeds. It is estimated by leading authorities that the country's full output of ship plates for two years will be required. The reporting of a $405,000,000 appropriation, with authorization running up to $750,000,000 for this purpose, in the senate war bill, marks an early date for vigorous action in this unexampled enterprise. In view of the very harmonious co-operation between the mills and the government, the discretionary power embodied in the bill for the commandeering of essential plants and products is not likely to be exercised or needed in the steel industry. The first definite act to provide a great tonnage of steel merchant vessels in addition to the proposed hundreds of wooden ships, is signalized by the award of eight 8,800-ton boats to a Pacific coast yard. About 30,000 tons of steel are involved. The federal shipping board now is negotiating with representatives of the steel industry for reduced prices on plain material to cover its bulk requirements. How much steel or how many ships this will mean wholly is a matter of mill and yard capacity. The British offer to turn over all work or contracts with American builders in behalf of that country, illustrates the military importance attached by the allied nations to the ship building program. Some doubt is expressed whether the price of 2.90c on plates and 2.50c on shapes and bars given to the army and navy will be granted to ship construction. The much higher market value of ship building material over ordinary commercial steel enters into the question. That the normal limits of production may be enlarged to meet the elements of time and magnitude is shown by the proposal to use standard structural sections in this construction, as well as the usual ship shapes, and to press sheet mills into the rolling of tank plates. The possible absorption of large fabricating shop capacity by marine work has added its influence in discouraging new building undertakings.

Pig Iron Still Jumping

The continuing rise in pig iron prices is coming in for more thoughtful attention and speculation of both producers and consumers in view of the broadening sweep of governmental authority. Sales of certain foundry products for war purposes have been made to the government at prices based on a certain cost of iron. The abrupt movement of prices is shown by the week's rise of $4 in valley bessemer, to $48; of $2 on Chicago grades; and of smaller advances at Buffalo, eastern Pennsylvania, southern Ohio and other districts. Buying has been more spotty with Chicago, Buffalo and the east the active points. Some foundry consumers, discouraged by the high prices and scarcity of early iron, are reducing operations to the extent of their assured supplies of raw materials. There is some doubt whether a 15,000-ton inquiry at Cincinnati for this year can be satisfied. The Bethlehem Steel Co. has been a buyer of basic. Export sales largely to Japan have been heavy, including 15,000 tons of resale bessemer iron and about 20,000 tons of basic at around domestic prices. Strike troubles have caused the banking of three southern Ohio furnaces.

Shipments of Lake Superior iron ore are still below normal. Accidents have been unusually numerous, owing to ice and necessarily mean further delay.

THE OPEN HEARTH

Co-operation, Not Compulsion Needed

THE reliance being placed by the government on the steel manufacturers of the country is a tribute to them. Tremendous as are the requirements already shown and to be shown, they will be met. But the government will have to be fair. The program for tonnage calls for wise execution. Awards must be distributed in an orderly and equitable manner. Prices must be based upon levels that will insure just profits. Wild reports such as the one about the government taking over the output of "every steel plant and ship yard in the country", and "cancelling all private contracts", ought to be suppressed. While that particular report was not justified, it was credited to a responsible government official, who, fortunately, soon discerned its pernicious character and recanted. It was completely discounted when there came a statement, said to have been made by President Wilson himself, that, while the government would ask for authority to supervise the output of the plants, it was not expected that it would be necessary to exercise such power. Responsible members of congress have also deprecated the sensational statement.

There can be no objection to the government, as a matter of precaution, assuming authority to supervise the output of private industry, or, where necessary, to cancel private contracts in order to divert essential materials at capacity. This plan can well be one of co-operation between the government and manufacturers. The latter can be much assisted by full and proper advance by the government to its needs and the necessity of any readjustment of production. There should be a relation of complete understanding at all times between the representatives of industry and of federal authority. The manufacturers will continue to rally loyally to the aid of the government; no coercion is necessary.

Manifestly the solution to the problem of efficient manufacturing on a war footing involves a spirit of co-operation, not compulsion. Taken as a whole, that idea seems to prevail in most government circles and it is most gratifying that it does. That spirit should be maintained.

Forced Financing a Peril

A CONSIDERABLE number of manufacturing companies, large and small, have been increasing their capital stock to finance purchases of raw material for future consumption. The reason usually given is the high and increasing cost of practically everything that goes into manufacturing. In many cases the finished product is held back from the ultimate consumer by inadequate transportation facilities; payment is delayed and capital consequently tied up. To the companies whose financial resources are limited, this presents a serious problem and necessitates increased working capital, which is being supplied frequently by new stock issues.

This is an element of danger in some of these capitalization increases. Business now is on a high keel, profits are large and the temptation toward an over-extension of capital liability and consequently of credit, especially with manufacturing materials still rising in prices and long delayed in delivery, is strong. The day will come, however, when these enlargements must answer to the question whether they are mere expedients or represent sound financing. For a considerable number of the smaller manufacturers to become panicky and to think they are obliged to buy up as much raw material as they possibly can get, only means a constant bidding up of prices on themselves.

Every company must decide how to serve its own best interests in a financial sense; but in looking after those interests it will best conserve its own resources, and promote the general good by exercising careful restraint.

Storage Facilities---A Rarity

THANKS to the ceaseless efforts of various agencies, including carriers, shippers and federal commissions, the transportation problem has receded from its recent position as the foremost detrimental factor in industry. Now that the machinery of freight traffic is running more smoothly, it is well to consider ways and means of averting the car shortage and congestion that are bound to occur in the fall when the winter's coal supply, Europe's grain requirements, furnace ore, and the allies' American-made munitions compete for railroad rolling stock.

The iron and steel industry has confronted similar problems during each of the past two years, and undoubtedly there is an inborn feeling that the same old remedies must bear the brunt of the burden. If this sort of helpless defense is again resorted to, we shall once more witness the deplorable spectacle of thousands of cars held on manufacturers' sidings as storehouses for raw, semi-finished and finished materials. This condition is imminent simply because in the normal times previous to 1915, cars were supplied promptly enough to obviate the necessity of storing material; and because since 1915, we have been too busy to seriously consider how effectively adequate storehouses would aid the system of transportation.

Unfortunately, many of the large steel plants were laid out with no provision for storage adjacent

THE OPEN HEARTH

to the delivery point of the finished product. This fact was emphasized last winter when several companies were obliged to pile billets, bars and other products in open fields miles from the mills, because there were no yards for this purpose near the plants. These object lessons should have a vital significance to men who are planning new mills and extensions to existing steel works. The experience should also lend its value to fabricators of metal products, such as manufacturers of motor cars, who last year were obliged to curtail production as much as 40 per cent in some instances, because they had no storage facilities for automobiles which could not be accommodated by the meager supply of freight cars.

The time to prepare for the threatened traffic troubles is now. Prompt attention to the storage problem will mean more cars for carrying freight, or in other words, greater efficiency for the allied war machine.

Putting the Railroads to the Test

TRANSPORTATION problems which have been very much to the fore in recent months of peace, promise to remain so with the country at war. In truth, the rail carrying facilities of the country have been overtaxed for some months past. The load of the high-geared prosperity has seemed to have exceeded the elastic limit of their capacity to operate on a speeded-up basis. Various explanations have been offered for this apparent lack of reserve power or of adjustment in meeting the peaks of traffic demands.

The country is about to endure an experience which should cast considerable light upon the question whether or not operating management or the form of it, of the railroads has had much or little to do with their recent predicament. With the council of national defense answerable to the administration, now directing through sub-bodies of practical men the movements of an increasing number of important commercial commodities, state supervision of rail operations, within limits, is a fact. Already in the handling of coal, coke and other raw materials, there are evidences of efficiency and co-operation which had not been shown under old conditions. This, of course, is what should be expected.

It is to be hoped that from this period of centralized control, will come demonstrations of co-ordinated and improved methods which will outlast the emergency and will pave the way for a more nearly theoretical perfection of service when normal conditions are restored. Likewise, if the government has been pursuing a niggardly course toward its transportation enterprises, it will have a better opportunity of learning at first hand the disastrous effects of such a policy.

Bee Hive Coke Still in Race

ALTHOUGH the upward movement of Connellsville coke has not been nearly so spectacular as the ascent of pig iron, quotations on bee-hive oven fuel in the last three years have advanced more sharply than prices on the blast furnace product in the Mahoning and Shenango valleys. This is rather surprising to many people who believed the coke regions of western Pennsylvania never would recover entirely from the depression that enveloped the coke trade a few years ago. The following table shows prices on these allied materials quoted by *The Iron Trade Review* in the first issue of May since 1914. Pig iron is quoted on a valley basis, and coke on an oven basis, prompt delivery.

	1914.	1915.	1916.	1917.
Bessemer pig iron.....	$14.00	$13.60	$21.00	$42.00
Basic pig iron.....	13.00	12.50	18.00	40.00
Foundry pig iron.....	13.20	12.50	18.50	42.00
Furnace coke.....	1.85	1.55	2.90	7.00
Foundry coke.....	2.40	2.00	3.50	9.50

In the last three years, bessemer has advanced 200 per cent, basic 208 per cent and foundry iron 218 per cent, an average of 209 per cent. In the same period, furnace coke has advanced 278 per cent and foundry coke 296 per cent, an average of 287 per cent, or a gain of 78 per cent for coke oven iron. Since May 1, 1915, bessemer has advanced 209 per cent, basic 220 per cent and foundry iron 236 per cent, an average of 222 per cent. Blast furnace and cupola coke since that date have jumped 351 and 375 per cent, respectively, an average of 363 per cent, or a gain of 141 per cent over the pig iron average for the same period. In the last 12 months, bessemer has advanced 100 per cent, basic 122 per cent and foundry iron 127 per cent; furnace coke has advanced 141 per cent and foundry coke 171 per cent. The advance registered by coke in the year just ended was 40 per cent greater than that made by iron.

These comparisons tend to indicate that Connellsville cokemakers have not yet felt the effects of the growth and development of the retort oven industry. Price tables are likely to tell an altogether different story after more nearly normal trade conditions exist generally. Many market observers predict coke prices will decline just as soon as the traffic and labor situations become more satisfactory. Moreover, additional by-product coke plants are being put in operation each year, reducing further the consumption of bee-hive oven fuel. Fortunately, Connellsville district coal is suitable for retort oven use, and the day is not far distant when standard Connellsville coal will be an important factor in the iron trade.

Iron and Steel Prices

Corrected up to Wednesday Noon

PIG IRON

(Delivery this year.)

Bessemer valley	$45.00 to 48.00
Bessemer, Pittsburgh	45.95 to 48.95
Basic, Pittsburgh	42.95
Basic, eastern Pa.	41.00 to 42.00
Basic, Buffalo	**39.00 to 40.00**
Malleable, Pittsburgh	43.95
Malleable foundry, Chicago	42.00
Malleable foundry, Philadelphia	**43.00 to 44.00**
Malleable foundry, Buffalo	**39.00 to 40.00**
No. 1X foundry, Philadelphia	43.50 to 44.50
No. 2 foundry, Pittsburgh	43.95
No. 2 foundry, Cleveland	43.30 to 45.30
No. 2 foundry, Ironton	40.00 to 42.00
No. 1 foundry, Chicago	43.00 to 45.00
No. 2 foundry, Chicago	**42.00**
No. 2X foundry, Philadelphia	43.00 to 44.00
No. 2X foundry, N. J. tidewater	43.00 to 44.00
No. 2X foundry, Buffalo	**40.00**
No. 2 plain, Philadelphia	42.75 to 43.75
No. 2 plain, N. J. tidewater	42.75 to 43.75
No. 2 plain, Buffalo	**39.00**
No. 2 southern, Birmingham	39.00 to 40.00
No. 2 southern, Cincinnati	41.90 to 42.90
No. 2 southern, Chicago	40.00 to 42.00
No. 2 southern, Phila. delivery	40.50 to 41.00
No. 2 southern, Cleveland	42.00 to 43.00
No. 2 south'n, New York docks	40.25 to 41.25
No. 3 southern, Boston docks	40.50 to 41.50
No. 2 south. interior, New Eng.	41.00 to 42.00
No. 2 southern, St. Louis	41.40 to 43.40
Virginia, No. 2X, furnace	40.00 to 42.00
Virginia, No. 2X, Philadelphia	42.75 to 44.75
Virginia, No. 2X, Jersey City	43.00 to 45.00
Virginia, No. 2X, Boston points	43.25 to 45.25
Gray forge, eastern Pa.	39.00 to 40.00
Gray forge, Pittsburgh	42.95
Gray forge, Birmingham	38.00
Silveries, 8 per cent, furnace	50.00 to 52.00
Silveries, 8 per cent, Chicago	**50.00 to 51.00**
Low phos. Standard, Phila.	76.00 to 78.00
Low phos. Lebanon, Pa., furnace	70.00 to 80.00
Low phos., Pittsburgh	70.00 to 75.00
Charcoal, Lake Superior, Chgo.	**49.25 to 51.75**
Charcoal, Buffalo	50.00 to 51.00

COKE

(At the ovens.)

Connellsville furnace	$8.25 to 8.50
Connellsville furnace, contract	**8.00**
Connellsville foundry, contract	8.50 to 9.50
Connellsville foundry	**9.50 to 10.00**
Wise county furnace, contract	7.00 to 9.00
Wise county foundry, contract	8.00 to 10.00
Pocahontas furnace, contract	7.00 to 9.00
New River foundry, contract	8.50 to 11.00
New River furnace, contract	7.50 to 10.00

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, delivered prompt	$425 to 475
Ferro manganese, 80 per cent, last half, delivered	400 to 425
Spiegel, 20 per cent furnace remainder of year	75.00 to 80.00
Ferro-silicon, 50 per cent, Pitts., **nominal**	**225**

Bessemer ferro-silicon, 9 per cent, $69; 10 per cent, $70; 11 per cent, $72.50; 12 per cent, $75; 13 per cent, $80 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila	**$70.00 to 80.00**
Forging billets, Philadelphia	**100.00**
Forging billets, Pbgh.	110 to 115
Forging billets, Chicago	**100.00**
Wire rods, Pittsburgh	90.00 to 95.00
Bessemer billets, Youngstown	90.00 to 95.00
Bessemer billets, Pittsburgh	90.00 to 95.00
Open hearth billets, Pittsburgh	90.00 to 95.00
Open hearth billets, Youngstown	90.00 to 95.00
Bess. sheet bars, Youngstown	90.00 to 100.00
Op. h'th sh't bars, Youngstown	90.00 to 100.00
Bess. sheet bars, Pittsburgh	90.00 to 100.00
Open hearth sheet bars, Pbgh.	90.00 to 100.00
Muck bars, Pittsburgh	70.00
Grooved steel skelp, Pittsburgh	4.00c
Sheared steel skelp, Pittsburgh	4.50c

RAILS AND TRACK MATERIAL

Angle bars, Pittsburgh, base	3.00c to 3.25c
Angle bars, Chicago, base	2.75c to 3.00c
Standard bessemer rails, mill	**$38.00**
Standard open hearth rails, mill	**40.00**
Light rails, 8 to 10 lbs., Pitts.	63.00
Light rails, 8 lbs., Chicago	63.00
Light rails, 12 to 14 lbs., Pitts.	62.00
Light rails, 12 lbs., Chicago	62.00
Light rails, 16 to 280 lbs., Pitts.	61.00
Light rails, 16 to 20 lbs., Chgo.	61.00
Light rails, 25 to 45 lbs., Pitts.	60.00
Light rails, 25 to 45 lbs., Chgo.	60.00
Relaying rails, standard, mill	**$38.00 to 40.00**
Relaying rails light, Chicago	**40.00**
Relaying rails, light, St. Louis	48.00 to 51.00
Spikes, railroad, Pittsburgh	4.00c
Spikes, railroad, Chicago	4.00c to 4.15c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.00c to 5.15c
Tie plates, Chicago	**$60.00 to 65.00**

SHAPES, PLATES AND BARS

Structural shapes, con. Pitts.	4.00c
Structural shapes, Philadelphia	4.159c to 4.659c
Structural shapes, New York	4.169c to 4.669c
Structural shapes, Chicago	4.44c to 5.44c
Tank plates, Chicago	5.19c to 7.19c
Tank plates, Pittsburgh (con.)	**4.50c to 4.75c**
Tank plates, Pittsburgh	5.50c to 7.50c
Tank plates, Philadelphia	5.159c to 7.659c
Tank plates, New York	5.169c to 7.669c
Bars, soft steel, Chicago	3.94c to 4.69c
Bars, soft steel, Pittsburgh	3.50c
Bars, soft steel, New York	3.919c to 4.169c
Bars, soft steel, Philadelphia	3.909c to 4.159c
Hoops, Pittsburgh	5.00c to 5.25c
Bands, Pittsburgh	4.75c to 5.00c
Bands, Pittsburgh (contr.)	3.50c to 4.00c
Shafting, Pittsburgh carloads	10 to 5 off
Bar iron, Chicago	3.35c to 3.50c
Bar iron, Philadelphia	4.159c
Bar iron, Cleveland	**3.50c**
Bar iron, New York	4.169c
Bar iron, Pittsburgh	4.00c
Hard steel bars, Chicago	3.50c to 3.75c
Cut nails, Pittsburgh	3.70c

SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pittsburgh	7.25 to 8.25
No. 28, bessemer, Pittsburgh	7.00 to 8.00
No. 28, Chicago	6.69 to 7.19

TIN MILL, BLACK.

No. 28, open hearth, Pittsburgh	7.25 to 8.25
No. 28, bessemer, Pittsburgh	7.00 to 8.00

GALVANIZED.

No. 28, open hearth, Pittsburgh	8.60 to 9.60
No. 28, bessemer Pittsburgh	8.35 to 9.35
No. 28, Chicago	9.19 to 10.19

BLUE ANNEALED.

No. 10, open hearth, Pittsburgh	6.75 to 7.75
No. 10, bessemer, Pittsburgh	6.50 to 7.50
No. 10, Chicago	6.69 to .7.19
No. 10, Philadelphia	6.659 to 7.159

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TIN PLATE

Tin plate, 100 lb., coke base, contract	7.50c to 10.50c
Tin plate, coke base, prompt	**8.50c to 11.50c**
Terne plate, I. C.	7.15c to 8.00c
Terne plate long	8.00c

WIRE PRODUCTS

(Retailers 5 cents above jobbers.)

Wire nails, jobbers', Pittsburgh	$3.50
Coated nails, Pittsburgh	3.40
Plain wire jobbers', Pittsburgh	3.45
Galvanized wire, jobbers', Pitts.	4.15
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted jobbers', Pitts.	3.65
Barb wire, galv., jobbers', Pitts.	4.35

IRON AND STEEL PIPE

(Price adopted May 1, 1917.)

Steel.

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 3, butt	49	35½

Iron.

(Prices adopted May 1, 1917.)

Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 1½, butt	38	22

CAST IRON WATER PIPE

Four-inch, Chicago	$58.50
Six-inch and larger, Chicago	55.50
Six-inch Class B, New York	**55.50**
Four-inch class B, New York	**58.50**
Four to six-inch, Birmingham	**48.00 to 50.00**
Six-inch and larger, Birmingham	44.00 to 46.00

Light weight water and gas pipe $1 per ton higher than standard water.

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	**36**

RIVETS

Structural rivets, Pittsburgh	4.75c
Boiler rivets, Pittsburgh	4.85c
Tinner's rivets, 40 and 10 off, Pittsburgh.	

STEEL SHEET PILING

Base sizes, Pittsburgh 3.50c to 4.00c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil 7.00c

COLD ROLLED STRIP STEEL

Base price, 7.50c to 8.00c per 100 pounds, **hard, coils 1½ inches and wider and by .100 inch and heavier.**

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

Carriage bolts ⅜ x 6 inches, smaller or shorter, rolled thread, 40; cut threads, 35 and 2½, larger or longer, 25.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 40 and 10; cut, 40; larger or longer, 30.

Cold pressed, semi-finished hexagon nuts, 50 and 10.

Gimlet and cone point lag bolts, 45. Hot pressed square nuts, blanks, $2.10 off; tapped $1.90 off. Hot pressed hexagon nuts, blank, $1.60 off; tapped, $1.40 off.

Cold pressed square nuts, blank, $1.70 off; tapped, $1.50 off. Cold pressed hexagon nut, **blank, $1.60 off; tapped, $1.40 off.**

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products May 16, average for April, 1917, average for February, 1917, and average for May, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 16, 1917.	Average prices April, 1917.	Feb., 1917.	May, 1916.
Bessemer pig iron, Pittsburgh	$45.95	$42.20	$35.95	$21.95
Basic pig iron, Pittsburgh	42.95	39.20	30.95	18.95
No. 2 Fdy. pig iron, Pittsburgh	43.95	39.95	33.95	19.45
No. 2, Fdy. pig iron, Chicago.	43.00	39.25	31.25	19.00
Lake Superior Charcoal, Chicago	49.25	42.25	34.50	19.75
Malleable, Chicago	43.00	39.00	31.25	19.50
Southern No. 2, Birmingham	39.00	35.79	24.50	15.00
Southern Ohio No. 2, Ironton.	42.00	38.60	33.00	18.50
Basic, eastern Pa.	40.00	38.25	30.50	20.00
No. 2X Virginia, furnace	40.00	38.25	29.00	18.00
No. 2X foundry, Philadelphia	42.75	41.50	32.00	20.50
Ferro mang., delivered	425.00	360.00	265.00	175.00
Bessemer billets, Pittsburgh	90.00	72.50	62.50	41.20
Bessemer sheet bars, Pittsburgh	90.00	72.50	62.50	41.20
Open hearth sheet bars, Pitts.	95.00	72.50	62.50	41.20
Open hearth billets, Pittsburgh.	95.00	72.50	62.50	41.20
Steel bars, Pittsburgh	3.50	3.387	3.00	2.50
Steel bars, Chicago	3.94	3.54	3.14	2.69
Iron bars, Philadelphia	4.159	3.659	3.259	2.559
Iron bars, Cleveland, local del'y.	3.50	3.25	3.00	2.40

*Seaboard.

	Prices May 16, 1917.	Average prices April, 1917.	Feb., 1917.	May, 1916.
Iron bars, Chicago mill	$3.35	$3.19	$3.00	$2.35
Beams, Chicago	4.44	3.79	3.38	2.69
Beams, Pittsburgh	4.00	3.70	3.25	2.50
Beams, Philadelphia	4.659	4.159	3.509	2.659
Tank plates, Pittsburgh	4.50	4.50	3.75	2.75
Tank plates, Chicago	5.19	4.69	3.94	3.09
Tank plates, Philadelphia	7.159	6.909	5.009	3.909
Sheets, blk., No. 28, Pittsburgh	7.00	5.75	4.56	2.92
Sheets, blue anld., No. 10, Pitts.	6.75	5.37	4.37	3.02
Sheets, galv., No. 28, Pittsburgh	8.50	7.56	6.50	4.88
Wire nails, Pittsburgh	3.50	3.20	3.00	2.50
Connellsville fur. coke, contr.	8.00	7.25	8.00	2.60
Connellsville fdy. coke, contr.	8.50	7.87	6.50	3.50
Heavy melting steel, Pittsburgh	28.00	28.12	21.87	17.12
Heavy melting steel, eastern Pa.	26.00	25.15	20.50	16.75
Heavy melting steel, Chicago	27.50	26.65	21.65	16.50
No. 1 wrought eastern Pa.	40.00	38.50	27.00	22.50
No. 1 wrought, Chicago	32.00	29.80	24.00	16.35
Rerolling rails, Chicago	35.00	31.88	25.63	17.25
Car wheels, Chicago	25.50	23.25	18.30	13.13

(For Additional Prices See Page 1106.)

Bessemer Nears the $50 Price Line

Some Lots for This Year Sold at $48, Valley—Chicago Up $2—Eastern Buying Active But in Other Districts High Prices and Shortage Have Effect—Government Orders Are Pushed

Pittsburgh, May 15.—Bessemer pig iron, heading rapidly toward the $50 mark, has been sold at $48, valley, or $4 a ton above the prevailing minimum price a week ago. A sale at that figure involves 300 or 400 tons for delivery late this year. Dealers are quoting this grade from $45 to $48. Not much tonnage has been sold in the open market this week. Basic appears steady at $42, at which price the last sale of importance was made. The situation for this grade is strong, but the market is quiet. Malleable and foundry are at $43 for delivery the remainder of this and the first half of next year. Several lots involving from 300 to 1,000 tons have been sold at $43, valley. Gray forge is quoted at $42, valley. Pig iron producers daily are receiving requests for iron from manufacturers working on government contracts. A local company, whose entire capacity is devoted to the manufacture of war material, has received this month 100 per cent of its metal requirements, compared with about 80 per cent before the United States entered the war. Consumers' requirements are being scrutinized closely, in order to serve the nation as efficiently and effectively as possible. Two blast furnace interests in eastern Ohio, filling contracts for Italian interests, are receiving 100 per cent of their car supply.

Export Sales Are Heavy

New York, May 15.—Large tonnages of pig iron have changed hands in this district during the past week. Approximately 15,000 tons of resale bessemer in New York harbor were disposed for export at a price around $44, New York. Much other export business has been done, including at least 20,000 tons of basic, at $40 and $42.50, eastern furnaces, a large tonnage of standard low phosphorus and also considerable foundry. Most of this iron is for Japan and is to be shipped overland for export at Seattle or San Francisco. A Syracuse, N. Y., melter took 1,500 tons of malleable, first quarter, from a Buffalo interest; a New Jersey electrical interest 1,000 tons of foundry, first half; a large malleable iron consumer, approximately 1,000 tons of prompt malleable for eastern New York delivery; and another nearby consumer 1,000 tons of foundry, first half. A Trenton, N. J., melter is out for 5,000 tons of No. 2X, first half. Numerous other inquiries are before the trade, including some unusually large tonnages, mainly for first half. Prices are stiffer all along the line. A large Buffalo maker, after selling a number of lots, mainly for first half, has advanced its asking prices to $46, Buffalo, for No. 2X for this year and to $43 for first quarter. Another large Buffalo interest has been selling small tonnages of foundry and basic at $45, Buffalo, for this year and at $40 for first half and in some cases now is quoting an advance of $1. Buffalo iron still can be had for this year at $44, furnace, for 2X. A considerable tonnage of prompt Buffalo low silicon was sold in the week at $42, furnace. Numerous sales have been made by eastern Pennsylvania furnaces at $40, furnace, for first half and which now is believed to be minimum. Quotations lower than $44, eastern Pennsylvania furnace, for this year are less numerous, though some sales are made occasionally, however, at $42.50 to $43. A central Pennsylvania furnace reports having sold small tonnages of 2X for first half at $45, furnace. A southern furnace which recently has been selling some No. 2

(*For miscellaneous prices see page* 1106.)

in this district at $35 and $36, Birmingham, for third quarter, now is holding for $38. Another southern maker, however, is offering No. 2 for this year at $35, Birmingham.

Can't Keep Up Operations

Cleveland, May 15. — Realization of their inability to obtain a steady supply of iron to maintatin the full operations justified by their order books because of shortage and transportation troubles is being reached by numerous foundrymen in this territory. Operations are slowing down to a point where they can be continued by regular contract deliveries on iron. Irregular shutdowns for a day or two are more numerous. Less effort is being made to buy spot iron, which is very scarce. Quieter buying prevails generally. Offerings for this year are very limited. For May-June, $44, Buffalo, was quoted on a small amount of No. 2X, equivalent to about $45, Cleveland, for No. 2. For first half of 1918 some tonnage of Buffalo No. 2X, was offered at $41, furnace, or about $42, Cleveland, for No. 2. One local maker who has taken business at $42, furnace, for this year and $40 for next year has withdrawn. A sale of 1,000 tons for first half brought $43, valley. A number of 100 to 500-ton lots have been sold at the same figure. One lake furnace is asking $43 for this year and $41 for next. Considerable business has been done in malleable, including 3,000 tons for the first half of next year to Indiana buyers, at $40, Chicago furnace; 3,000 tons of lake iron for last half and first half to the Pittsburgh district, and 2,500 tons from another lake furnace for the first half of next year to Michigan and Ohio buyers. One lot of 2,000 tons for first half brought $42. The seller now is quoting $43, furnace. A sale of 200 tons of 8 per cent silvery for last quarter and first quarter was closed at $52, Ohio furnace. On 3 per cent Alabama $41.50, Birmingham, was named. A southern Ohio consumer who wanted 10,000 to 20,000 tons of basic for this year was unable to satisfy this inquiry in full. The Central Steel Co., Massillon, O., has disposed of its inquiry for 5,000 tons or more of basic under special arrangements.

Foundry and Basic Active

Philadelphia, May 14.—Heavy buying of foundry and basic featured the pig iron market in this district during the past week. The Bethlehem Steel Co. purchased between 5,000 and 7,000 tons of early basic and fully 10,000 tons of basic have been sold for export to Japan. Most of the latter business went at $42, furnace, while considerable went at $42.50. The basic market on domestic business now is around $42, Philadelphia. A Virginia seller, after closing within four days about 15,000 tons at $40, furnace, for No. 2X for first quarter of 1918, and at $38 for first half has withdrawn. Very little Virginia iron remains to be had. The leading Virginia producer continues out of the market. A heavy business, mostly in small lots, but comprising several lots of 1,000 tons or more, has been booked by Pennsylvania foundry makers. No. 2X for this year now is at $43, eastern Pennsylvania, and New Jersey furnaces, minimum. The market is quoted at $43.50 to $44, Philadelphia. One eastern Pennsylvania maker, who sold considerable iron at $42, furnace, for No. 2X, now is at $43 for this year and first half. Another maker, who was doing $43.50, furnace, on No. 2X for this year, now is at $44, and has sold small tonnages at $45. At least two other eastern Pennsylvania makers have nothing for this year under $44, furnace. First half prices also are firmer, and $40, furnace, now is minimum. Some makers want $40 to $43. A large tonnage of first half foundry was taken at $41, eastern Pennsylvania furnace. One central Pennsylvania maker, who recently was selling first half at $36, furnace, has sold several hundred tons for first half at $39, furnace. A Delaware consumer has taken 2,000 tons of eastern Pennsylvania malleable, first half. A Phillipsburg, N. J., consumer, who recently placed 3,000 tons of foundry, is understood to have placed another 3,000 tons for first half, and is inquiring for an additional tonnage. A car manufacturer bought 1,000 tons of No. 2 southern for third quarter to a plant in Pennsylvania at $36, Birmingham. The Lenoir Car Works is in the market for an additional tonnage of No. 2 for this year. A Pittsburgh interest has taken 1,000 tons of No. 2 southern at $36, Birmingham, for this year. The market in low phosphorus iron is quiet. An eastern Pennsylvania steel maker asks about 10,000 tons of standard iron. The government has purchased at a material concession 500 tons of prompt standard low phosphorus, for the Watertown arsenal.

Wants Last Half Tonnage

Cincinnati, May 15.—An inquiry for 15,000 tons for last half equally divided among bessemer, basic and malleable grades has been put out by the Ohio Mold & Foundry Co. for its new plant here. Foundry iron is not quite as active as a week ago. A number of contracts, however, have been closed lately for the first half of 1918. Southern iron for next year's delivery is quoted around $36 to $36.50, Birmingham. For this year's shipment, $38 to $39 represent the minimum, and it is only for the last quarter that the lower price can be done. The small amount of prompt iron available in the south is held around $40, and this includes the small tonnage of warrant iron still on hand. Northern No. 2 foundry has been advanced by southern Ohio producers to $43 for this year's and to $42 for first half of next year. No sales are reported at the advanced figures, but a number of deals are under negotiation. It is difficult to get a line on the exact quotations on Ohio silvery irons for this year, but some business has been booked for the first half of 1918 at $49.50 at furnace for 8 per cent. At least one Jackson county furnace is quoting as high as $50 for this delivery. A sale of 200 tons for last quarter and first quarter shipment outside this district was done at $52, furnace. Strike troubles, which have caused the banking of the Star and Globe furnaces at Jackson, are blocking both production and shipments of these stacks in silveries and bessemer ferro-silicon. Reports are current that a Kentucky steelmaker has bought basic from a southern Ohio maker who recently made sales of this grade for northeastern Ohio delivery.

Many Sales at Buffalo

Buffalo, May 15.—A leading interest of the Buffalo district has sold in the past week about 20,000 tons of all grades of iron for delivery over last half and first half of next year. Other furnaces have sold considerable tonnages. Most of the iron placed was in lots from carloads up to several hundred tons. One purchase was for 4,000 tons of foundry and another for 1,000 tons. The latter orders are for 1918 deliveries. Malleable and basic have been advanced by some makers to $46 to $47, furnace, for this year. For next, $43 is asked by some makers, but others will do less. Charcoal iron, scarcer than ever, is being quoted at $50 to $51, for delivery this year. A number of sales have been closed for 1918 needs. One producing interest, which is offering prompt iron, has been quoting $43 to $45, for foundry grades.

Chicago Iron Advances $2

Chicago, May 15.—With large inquiry continuing and heavy sales resulting, makers of northern pig iron have advanced their quotation $2 per ton, making the price $44, furnace, for last half of 1917, furnace, and $41, furnace, for first half of 1918. These prices apply to foundry, malleable and basic. The new level apparently is well established. Consumers have

(*For miscellaneous prices see page* 1106.)

come to the conclusion that they must make contracts now, as they may be unable to obtain iron later. While a few melters believe there will be sufficient iron for all users, whether bought now or later, evidence is accumulating to indicate that a real shortage is likely and those who delay may be unable to cover their needs. Southern iron is difficult to obtain for prompt delivery, and $38, Birmingham, seems the minimum. A recent sale of 2.00 manganese and 2.50 silicon, Virginia, for spot delivery, was at $50, delivered, Chicago. Southern interests willing to take tonnage for first half are quoting from $35 to $40, Birmingham, according to individual policies. One interest, which has been quoting $35 for first quarter on strictly No. 2 analysis, has withdrawn and has nothing to offer in soft grades. Eight per cent silveries are quoted at $52.75, delivered Chicago, for last half of 1917, with an unusually limited supply. Sales for first half of next year are slow, as makers are unwilling to contract heavily until the question of coke supply is settled definitely. Lake Superior charcoal iron continues at a range of $49.25 to $51.75, delivered Chicago, with a limited supply.

Demand Far Exceeds Supply

St. Louis, May 15.—Pig iron has developed no change during the week, since prices continue very strong, and the demand is of record proportions. Dealers declare they could easily place many thousand tons in excess of the iron they can get. The demand from all classes of consumers is active. Shipments of iron on contract are in fair shape, though much below normal. There was a slight tightening in the car situation to the north, but from Birmingham the movement is making a better showing than heretofore. Manufacturers here are figuring on iron to cover extensive government contracts. Unless the government can help out, however, this business is likely to go to other points. Sales of two cars of No. 2 southern foundry iron were reported during the week at $45.40, St. Louis, the highest price of the movement. Quotations are $43.40 to $45.40 for spot or immediate shipment, and $39.40 to $43.40 for first half of 1918. A considerable tonnage has been contracted for on a basis of the latter range.

Alabama Deliveries Delayed

Birmingham, May 15.—The pig iron market in the south shows strength on small lot sales for immediate delivery and on a fair amount of business placed for first half of next year. Sales of high silicon iron were made here the past week at $41, furnace, while standard No. 2 foundry, in small lots, went at $38. A minimum price for No. 2 at present is $36, which is acceptable to two or three makers for first half of next year. But little effort is being made to get business, however. Inquiries for iron from all directions are in hand and the aggregate tonnage being figured on is large. Only regular customers are able to get iron for this year's delivery. Much trouble still is being caused by backward deliveries and car shortages together with some embargoes. Some of the smaller iron companies have fared quite well in the supply of cars. Appeals have been made to higher officials of railroads in this section for some relief. The estimates of production for the first half of the month indicate that Alabama will make a heavy report for April. The Gulf States Steel Co. is getting about 40 tons a day, basic iron, from the little Eagle furnace at Attalla. The Tennessee Coal, Iron & Railroad Co. plans further additions at Bessemer next month. No changes in steel operations are noted in this section, maximum production being sought at all plants.

Semi-Finished is Soaring

Sheet Bars Still Rising With $100 Now Declined—Billets at $95—Large Shell Steel Inquiry

Pittsburgh, May 15.—The roof apparently is off the market for semi-finished steel. Lots of 1,000 tons each of ordinary soft steel open hearth sheet bars have been sold for third quarter at $95, mill, and $100 has been paid for small tonnages for nearby shipment. A finishing mill has just paid $95 for 4 x 4-inch ordinary soft steel billets. Heavy demand exists for shell steel. An exporter wants 5,000 tons of 4¾-inch round billets, 16,500 tons of 7-inch round billets and 39,600 tons of 10½ x 12¾-inch billets for foreign shell-makers. The United States government is an active factor in the market, but federal officials are not saying much about purchases. Makers say wire rods will touch the $100 mark soon. No sales have been made recently in the open market. Muck bar is pegged at $70, Pittsburgh.

Cold Rolled Up $10

Pittsburgh, May 15.—Strip steel makers have boosted their minimum price $10 a ton to 7.50c for shipment at their convenience. Higher quotations on billets are said to be responsible for the advance in strip steel. Demand continues extremely heavy.

Eastern Market is Active

Philadelphia, May 14. — Activity in semi-finished material in this district has been more pronounced. A western steel maker is offering 7,000 to 8,000 tons of open hearth rerolling slabs at $85, Pittsburgh. An eastern Pennsylvania maker quoted $90, Pittsburgh, on 2,000 to 3,000 tons of open hearth rerolling billets for Canada. Two lots of 1,000 tons of open hearth rerolling billets each have been sold for export. The 4 x 4-inch billets, went at $75, New York. New inquiries involve 1,500 tons of open hearth rerollers; 3,000 tons of open hearth rerollers; 1,000 tons of open hearth wire rods, and other tonnages for export, as well as numerous domestic tonnages including one of 1,500 tons of open hearth rerollers. On the 1,000 tons of wire rods for export, $95, New York, was quoted by one interest. A large steel company during the past few days offered shell discards at the rate of several thousand tons monthly but no business yet has resulted.

Decline Offers of $100

Cleveland, May 15.—Offers of $100, mill, for open hearth sheet bars, both for delivery by July or through the third quarter, have been declined by a local producer. The latter temporarily has withdrawn from the market and is making no sales or quotations. Early in the week, a lot of 9,000 tons of third quarter bars, which had been pending for several days, was closed at $95, Cleveland mill. Another seller disposed of 2,000 tons of bessemer bars for June-July at $90, western Pennsylvania mill. No billet quotations are being made at present by local producers.

No Valley Bars Offering

Youngstown, May 17.—To all but regular customers the market for valley sheet bars, bessemer or open hearth, either for prompt delivery or for third quarter, is a closed book. Nothing is being offered for last quarter. When the books are opened, it is not believed that less than $100 will be quoted, even to regular customers, on bessemer semi-finished material, and from $5 to $10 higher on open hearth. Few tons of sheet bars for delivery in the third quarter remain even for regular consumers. Not less than $85 is being quoted on bessemer, according to the only maker in the market. Much higher prices have been offered by consumers who are not regular customers, but these have been turned down.

(*For miscellaneous prices see page* 1106.)

War Bar Tonnage is Heavy

Details of Shell Steel Buying Are Withheld—Auto Builders Inquire Far Ahead—Bar Iron Up

Pittsburgh, May 15.—Except to say that the government wants heavy tonnages of rounds, sales agents at this center offer no information about the purchase of material for the manufacture of shells. It is understood, however, that firms furnishing 1-pound shells for submarine chasers have been active factors in this and adjacent territory. Bar steel nominally is quoted at 3.50c for future delivery. Iron bars have been advanced $5 a ton, to 4c for carload lots. For less than carload tonnages, 4.25c is quoted.

Take Contracts at 4c

Philadelphia, May 14.—Some contract business in steel bars has been booked by a leading eastern Pennsylvania maker at 4c, Pittsburgh. This business, which did not involve a large tonnage in the aggregate, comprised most of the activity in the steel bar market here during the week. Some other makers continue to quote around 3.75c, Pittsburgh, but this level is nominal, as there are no sales. Demand continues brisk.

Hard Bars Are Firmer

Chicago, May 15.—Hard steel bars, which have been quoted at 3.50c, Chicago mill, are stronger as demand for spring construction work involving reinforced concrete becomes heavier. While 3.50c, Chicago, continues to be done, some business has been placed at 3.75c, Chicago. The full effect of the reinforced concrete demand is not yet felt, though the market is experiencing it in a larger degree.

Supply is Scarce

Chicago, May 15.—With a waiting market, holding back until full requirements of the government have been made known, quotations on steel bars are difficult to obtain. Most makers are refusing to take on further business. The leading interest is practically out of the market for any delivery and some important independents having their output covered for the remainder of this year. On a recent small sale 3.94c, Chicago, was done, and other transactions indicate that prices up to 4.69c, Chicago, have been obtained for nearby deliveries.

Canada Wants Bars

Buffalo, May 15.—While the domestic market has been quiet, owing to the uncertainty as to the government requirements, there has developed a considerable inquiry for bar material from Canadian users. Some agencies have been advised by mills not to book orders, except upon advice from mill offices, until the government needs have been ascertained.

Expect Big Truck Orders

Cleveland, May 15.—Large orders for automobile trucks for the government are expected to be distributed in the near future. One estimate is that 20,000 will be placed. Some of the larger truck makers in this territory are inquiring for liberal quantities of special steel products for delivery as far in next year as the mills will accommodate them. These requirements do not appear to be for government work, however. Considerable question is being raised among the automobile builders themselves as to the conditions in the pleasure car market likely to prevail with the war situation. The general expectation is that the demand will be considerably restricted.

Chicago Market Higher

Chicago, May 15.—Bar iron from Chicago mills seems to have firmed up to 3.35c, Chicago mill, minimum, and some transactions are at 3.50c, Chicago. The former quotation of 3.25c, Chicago, probably could be done on a small tonnage with attractive specifications. The demand is strong. Inquiry is appearing for further tonnage by users who had bought previously and find their supply insufficient. Railroads and agricultural implement manufacturers are among the larger inquirers.

Shafting Makers Busy

Pittsburgh, May 15.—Shafting manufacturers are operating plants at maximum capacity, to meet demands of the domestic trade and fuse makers. Details of orders for fuses are not available. Shafting is being held at 10 to 5 per cent off the list by most makers.

Nuts and Bolts Stronger

Pittsburgh, May 15.—Ship builders are urging rivet manufacturers for deliveries. Premium prices frequently are being paid for prompt shipment. Nuts and bolts also are active and early advances in price appear probable. Makers generally are quoting only upon application.

Hoops and Bands Marked Up

Pittsburgh, May 15.—Actual sales of hoops and bands have been made at 5.25c and 5c, respectively, or about $10 a ton above previously prevailing nominal prices. Only a few mills are figuring in the market and they control the situation. Manufacturers say the market has not been affected by the war.

Sheet Buyers Are Anxious

Auto Builders Fear Shortage in Supply—Government Buying Freely—Galvanized Sells at 10c in East

Pittsburgh, May 15. — Manufacturers of steel sheets, with few exceptions, have withdrawn from the market. Surplus tonnage has been absorbed by the government. Inquiries are numerous, but not many new sales are being made. Black sheets this week have sold at as high as 7.50c for No. 28 gage, and blue annealed products have commanded 7.10c for early delivery. Eastern mills are offering the latter product at 6.75c for fourth quarter. Galvanized sheets are commanding 9c and above.

Automobile Makers Anxious

Manufacturers of automobiles are apprehensive about sheet supplies for the remainder of the year. Pleasure car builders have sent representatives to this and adjacent territory, in an effort to expedite the movement of material. Some car builders are paying 8c for prompt delivery. Electrical equipment makers confront conditions similar to those faced by automobile builders. Deliveries of electrical stock, however, are not so badly deferred. Rather heavy tonnages of electrical sheets are being shipped abroad at 7.50c and above.

Italy Asks for Tonnage

Youngstown, May 15.—A sale of several hundred tons of black sheets at 8.50c, mill, is reported by a leading maker here. Odd lots still may be had at 7.50c, mill. No blue annealed material is offered for sale at any price, and coated stock is quoted at 9.50c to 10c, mill. Except where consumers have contracts or long standing as preferred customers, nothing but such odd lots can be had. Some of the older stocks are being sold at slightly lower prices. Practically, there is no sheet market in the valley. Many inquiries specifically state that the mill may name any figure it chooses. An inquiry from the Italian

(*For miscellaneous prices see page* 1106.)

government for 1,000 tons of galvanized sheets has been turned down. A tonnage of that size could not be bought today except possibly by the United States government. Despite transportation difficulties, production is steadily improving in this territory. Most manufacturers are working close to their rated capacity. Most of plants in the valley are experiencing worse traffic conditions this week than has been the case for months. Most of them are getting hardly 50 per cent of their car requirements.

Galvanized Sells at 10c

Philadelphia, May 14.—Sales of several hundred tons of galvanized sheets for shipment into this district have been made here at 10c, Pittsburgh, for No. 28. Blue annealed sheets for shipment in a few weeks, have been sold here by a western maker at 7.50c and 8c, Pittsburgh, for No. 10. No further sheet offerings outside of special analysis sheets now are being made. Several hundred tons additional of blue annealed sheets have been placed here by the government. No. 10 gage blue annealed continues to be quoted by the leading eastern maker at 6.50c, Pittsburgh, for third quarter, but this figure is largely nominal.

Sheet Prices Strong

Chicago, May 15.—Action by the government recently to bring a better supply of sheet bars to mills in an effort to increase the supply of canning material has not affected prices, which remain strong. No. 28 gage black and No. 10 gage blue annealed are quoted at 6.69c to 7.19c, Chicago. No. 28 galvanized is selling at a range of 9.19c to 10.19c, Chicago. Demand is strong and many consumers are seeking heavy tonnages with small success.

Rail Tonnage Placed for 1919 Delivery

New York, May 16. (By wire.)—A big demand for all kinds of railway equipment is current and as not nearly all of this can be supplied the only solution seems to be to cut down passenger trains. Many steel mills have to shut down a week or more at a time because accumulation due to lack of cars prevents operation. About 60,000 tons of rails placed for 1919 delivery. The New York Central is in the market for 300 locomotives.

The Matthews Boat Co., Port Clinton, O., has received an order for 10 submarine chasers

Plate Demand Will Be Huge

To Meet Governments Ship Program—Estimated Two Years' Output of Country Will Be Needed

New York, May 16. (By wire.)—Entire output of ship plates of the country for two years will be required for the government ship building program according to leading authorities. Sheet mills probably will be pressed into the rolling of light tank plates in order that all mills capable of doing so may concentrate on Lloyds plates. It is pointed out that the present destruction by submarines is greater than the entire shipbuilding capacity of the world. The Standard Oil Co. is understood to have placed large forward contracts for plates for its various needs.

Ship Plates Bring 10c

Philadelphia, May 14.—Sales of several thousand tons of Lloyds ship plates have been made by eastern mills at 10c, Pittsburgh. Demand for locomotives is bringing out heavy plate requirements. One inquiry calls for approximately 15,000 tons of locomotive plates for the large Russian order. Great activity characterizes the plate market. Inquiries have been large and urgent and the buyers are having great difficulty in persuading the mills to accept their orders. Large consumers persist in trying to cover their requirements for the future, in some cases for the first half, but the mills refuse to quote on business for specification after July 1. These makers are swamped with work and the earliest shipments available are from nine to 12 months, depending on the character of the specifications. Much government work lately placed has resulted in numerous requests for prompt shipment of plates and the mills are giving preference to such requirements. Leading eastern Pennsylvania plate makers now quote 7.50c, Pittsburgh, as minimum, on tank plates, making Lloyds ship plates 9.50c to 10c, and marine boiler steel, 17c, or higher.

Sell Plates at $400

Philadelphia, May 15.—Another high record of prices has been scored in the phenomenal eastern plate market. A sale of about 500 tons of marine boiler steel for delivery during the next five months has been made at 20 cents per pound, mill, or $400 per ton. Shipment is to be made to a gulf point. This is the highest price for any commercial quality the eastern plate market has developed.

Plate Mills Withdraw

Pittsburgh, May 15.—Constantly increasing demands of the government have caused several leading manufacturers of steel plates to withdraw from the market entirely. Tremendous tonnages are involved in the naval and merchant ship programs, about which very little information is being given. Ship plates are selling at as high as 7.50c. The Carnegie Steel Co. has made no change in its 4.50c price for delivery at its convenience, but is offering little tonnage.

Market is Narrow

Chicago, May 15.—Steel plates continue to be almost out of the question and buyers find it most difficult to place further tonnage with any maker. Quotations range from 5.19c to 7.19c, Chicago, according to delivery. Large tonnages are practically impossible to place. Demand for export is heavy. Makers are holding back sales, waiting for government requirements.

(*For miscellaneous prices see page* 1106.)

Gear Makers Meet

Manufacturers at Pittsburgh Discuss Problems of Gear Making

Thirty-four manufacturers from all sections of the United States pledged their support to the standardization of gears at the second annual meeting of the American Gear Manufacturers' Association, held May 14 and 15, at the Schenley hotel, Pittsburgh. Two of the four papers presented at the meeting were devoted to advantages gained from standardization. Frank Burgess, the Boston Gear Works, Norfolk Downs, Mass., read a paper Tuesday morning on, "Job Gearing—To What Extent Can it be Standardized?", and at the afternoon session that day, George L. Markland, Philadelphia Gear Works, Philadelphia, talked about "Difficulties of Gear Standardization".

F. W. Sinram, the Van Dorn & Dutton Co., Cleveland, president of the association, called the session to order Monday morning. S. L. Nicholson, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discussed "The Ins and Outs of an Industry Organization", after which James E. Gleason, the Gleason Works, Rochester, N. Y., read a paper entitled "The Spiral or Curved Toothed Bevel Gear". Both papers were discussed at length.

Shortage Fear Halts Work

Builders Anticipating Tying Up of Fabricating Shops for Government Ships, Drop Jobs—Some Shape Cancellations

New York, May 15. — Published reports that government would enlist entire capacity of fabricators in building steel ships have been taken very seriously by many prospective builders. As a result numerous projects definitely slated for early action have been dropped. One shape mill reports four or five cancellations, due to fear that work on building might be halted at any time through lack of steel. While expectation is that fabricators will be called upon to participate in shipbuilding program there is no ground for believing they will not continue to be able to take care of structural commitments. Talk is being heard here that use of standard shapes for ship building instead of bulb angles and regular ship sections is a possible development soon. Fabricators are finding themselves seriously handicapped by the shortage of plates. On 600 tons of plates for inspection sheds for the public service commission, wanted for immediate erection, the usual promises have been after Jan. 1. Demand for plain structural shapes continues active. The market is from 4.25c to 4.50c, Pittsburgh.

April structural awards declined 7 per cent, or about 12,500 tons, according to the monthly figures of the Bridge Builders' & Structural Society. They were 61 per cent, or approximately 110,000 tons.

Large Inquiries are Current

Philadelphia, May 15.—Large inquiries continue to come out for plain structural shapes. A Philadelphia jobber wants 1,500 tons and numerous other inquiries are out for all kinds of domestic sources as well as for export. The minimum price in this district is 4.50c, Pittsburgh, on shipment at mills' convenience while at least two makers are asking 4.75c on preferred deliveries. Small quantities have been sold at 5c, although not as a base price. Standard sections are sold up from three months to a year, depending on sizes, and special sections about three months.

Projects are Held Up

Pittsburgh, May 15. — The domestic situation on structural steel is quiet, apart from the heavy government requirements. It is likely that numerous proposed structural undertakings will be abandoned temporarily on account of deferred deliveries caused by the war. Structural shapes nominally are quoted at 4c for shipment at the convenience of the maker. Little material is being sold in the open market.

Little Buying in West

Chicago, May 15.—Present prices of structural shapes seem to have almost swept the market clear of prospective buyers. Only small lots for construction work are now being inquired for. Comparatively little new work is being offered. Plain material is quoted at 4.44c to 5.44c, delivered Chicago, with mills reluctant to take on further tonnage.

CONTRACTS AWARDED.

Open hearth extension, Donner Steel Co., Buffalo, 300 tons, to American Bridge Co.

Dividing Up Cars

Pittsburgh, May 15.—Regulation of transportation facilities by the government through special committees of large shippers is beginning to manifest its effect in the iron and steel markets. The Pennsylvania railroad has cut down, by 20 per cent, allotments of gondola and hopper cars to leading steel companies in this district. This equipment is being diverted to more efficiently handle coal and coke shipments. Some steel companies have been adopting the expedient of shipping heavy plates and shapes in box cars. This is causing some dissatisfaction among customers because of unloading difficulty. It is understood that shipments of coke by box car are being discouraged.

Plant addition, Aluminum Castings Co., Buffalo, 280 tons, to C. F. Ernst's Sons Iron Works, Buffalo.

Buildings, Buffalo General Hospital, 200 tons, equally divided between Ferguson Steel & Iron Co. and Kellogg Structural Steel Co.

Bridge at Trenton, N. J., for Philadelphia & Reading Railroad, 330 tons, to McClintic-Marshall Co.

Additions to various plants of the Aluminum Company of America, Pittsburgh, 1,500 tons, to McClintic-Marshall Co.

Structural steel for roaster buildings at Humboldt, Ariz., for Consolidated Arizona Smelting Co., 423 tons to independent shop.

Bridges for Pennsylvania railroad, 300 tons, to American Bridge Co.

Metal storage for Bridgeport Brass Co., Bridgeport, Conn., 300 tons, to Eastern Bridge & Structural Co.

Building for Hershey Chocolate Co., Hershey, Pa., 1,000 tons, to L. F. Shoemaker & Co.

Stanley Theater, Philadelphia, 1,150 tons, to Milliken Bros.

Crane runway for Siberia, 400 tons, to Milliken Bros.

CONTRACTS PENDING.

Buildings for arsenal, Watertown, Mass., 800 to 900 tons, bids being taken.

North avenue viaduct, Milwaukee, 375 tons of structural reinforcing material. Bids to be taken June 1.

Jewish Center building, West Eighty-sixth street, New York, 500 to 600 tons, bids being taken.

Building for Lukens Steel Co., Coatesville, Pa., 200 tons, bids being taken.

(*For miscellaneous prices see page* 1106.)

Hurrying Tubes

To Boiler Manufacturers for Government Work—Shipments Pile Up

Pittsburgh, May 15. — Boiler manufacturers working on contracts for the government are being given first consideration by iron and steel tube manufacturers. Special agents are cooperating with manufacturers to distribute material as equitably as possible. Deliveries, in many instances, are deferred a year or longer. Certain sizes of seamless tubing cannot be promised in less than three years. Outbound railroad shipments are just as bad as ever. From 5,000 to 50,000 tons of finished material have been piled by mills in the Greater Pittsburgh district, as a result of the scarcity of cars.

Cities Not Buying

Chicago, May 15.—Present cost of cast iron pipe apparently has put it in the class with luxuries as far as cities are concerned and practically nothing is being asked for. At a time when inquiry usually is brisk the western market offers only small tonnages. Bids are to be opened by Milwaukee, May 15, on 250 tons of 8 and 12-inch pipe and by Toledo, May 29, on 400 tons. Minneapolis recently awarded 320 tons to the American Cast Iron Pipe Co.

Expect Better Business

Birmingham, May 15.—Cast iron pipemakers in southern territory are looking for a stronger demand this summer. Old contracts, together with the scattering business being received currently, warrants active operations. As has been stated before, provision has been made by these interests for a considerable portion of their iron needs ahead, though every now and then some deals are put across for the product. Shipments of pipe from several pipe plants in the south are active.

The Reilly-Peabody Fuel Co., Frick building, Pittsburgh, has purchased a controlling interest in more than 1,400 acres of coal lands and a mine near Lonaconing, Md. The capacity of the mine will be increased from about 400 tons to 2,500 tons daily. The output of the mine, formerly handled by the Georges Creek Coal Mining Co., will be offered by the Reilly-Peabody company.

Russia Wants Equipment

Now Actively Seeking 1,000 Locomotives and Many Cars—Railroads Inquire Far Ahead for Locomotives

New York, May 15.—Russia again is in the market actively for large blocks of railroad equipment including 1,000 locomotives and many cars. Financing of these requirements is the main problem. Heavy inquiries continue to be submitted to the locomotive builders from all sides and for distant delivery. The prospect is that these will materialize shortly in large orders. It is understood that the present high prices on plates and other steel is likely to hold up the placing of this business for a time. The New York Central is in the market for 75 locomotives; the Southern railroad for 25 and the New York, New Haven & Hartford for a considerable number.

Spikes in Demand

Pittsburgh, May 15.—A galvanizing interest is negotiating for 17,500 kegs of bolt spikes, to be delivered the last six months of this and the first six months of next year. Spikes are held at 4.25c, base, for ⅜-inch and larger. Several makers have advanced prices of standard spikes $3 a ton to 4c. Smaller sizes have been advanced similiarly; 2½ x ⅜-inch are quoted at 5c; 3 x ⅜-inch, 4.50c; 3½ x ⅜-inch and larger, 4.25c. Railroads in all sections of the country have been active factors in the market. Consumers say angle bars no longer are available at less than 3c. Track bolts for prompt shipment are being sold at as high as 8c.

Russia Wants Cars

Chicago, May 15.—Two inquiries for freight cars are being considered, but aside from these, practically nothing is under negotiation in the west except a few passenger cars. The New York Central railroad is inquiring for 1,000 50-ton gondolas, and the Russian government for 3,000 or more four-wheel cars of about three tons capacity.

Fear Motive Power Shortage

Cleveland, May 15.—Active demand for motive power both for domestic and foreign roads is causing apprehension among leading systems as to their ability to get deliveries as desired next year. Accordingly, some of them are inquiring for large numbers of locomotives for extended shipment in 1918. Russia again is actively inquiring for large lots of railroad equipment, including up to 300 locomotives, estimated to require about 30 tons of steel each. The Wheeling & Lake Erie has placed 2,000 kegs of spikes for the last half and there are other miscellaneous inquiries. Large producers are quoting a minimum of 3.85c, Pittsburgh, on spikes, and in most cases, 4 cents is asked. Some lots of rails for domestic lines and 21,000 tons of light sections for trench work for France remain pending.

Shipments Rise

Movement of Lake Superior Iron Ore Increases Rapidly

Cleveland, May 15.—Iron ore is reaching lower lake ports in steadily increasing volume, but the movement has not attained midsummer proportions. Practically all boats are in service, but floating ice in the Soo waterways is impeding navigation. Marquette harbor is still closed and several boats of the Cleveland-Cliffs Iron Co. have been held in the ice there for 10 days to two weeks. Two 7,000-ton ore carriers were sunk in a collision near Detour, Mich., on Monday. Minor accidents have been numerous and much time will be lost while repairs are being made.

Nation's Needs

Receiving Most of Attention of Tin Plate Makers Now

Pittsburgh, May 15.—Tin plate manufacturers are devoting nearly all of their time to the urgent needs of the government. A conference is being held at Washington today to further expedite the movement of material entering into the manufacture of perishable food containers. It is likely that food stuffs will be classified to determine which are perishable. Tin plate makers say they will be able to meet demands of packers this year, unless some unforseen operating difficulty arises. Outbound shipments are much better than previously and even further improvement is promised. The domestic market is exceedingly quiet. Small sales have been reported at as high as $11.50, base.

Stocks Depleted

In Wire Products and Makers Are Offering Little For Sale

Pittsburgh, May 15.—Wire products are scarcer than ever. Virtually every manufacturer in this district has withdrawn from the market. Scarcely any tonnage is being offered for nearby delivery, and mills are refusing to sell for forward shipment. Jobbers are specifying briskly to meet needs of consumers. Middlemen have very little material on hand and mill stocks are almost depleted. The government is credited with buying heavy tonnages quietly. Material for nearby shipment is being sold at above $3.50 a keg for nails. Some makers are quoting $4 per keg. The American Steel & Wire Co. has made no changes in its quotations since March 5, when it adopted the $3.20 price on nails.

(For miscellaneous prices see page 1106.)

Rising Prices

Still Mark the Warehouse Situation in All Districts

New York, May 15.—Warehouse prices on iron and steel show an advancing tendency, although the larger interests still are quoting the level reported last week. This is 5c on plain shapes, 7c on plates, 4.75c on soft steel bars, 4.85c on reinforcing bars, 4.50c on iron bars, 7c on No. 10 gage blue annealed sheets, 7.75c on No. 28 gage 1-pass cold rolled sheets and 9.75c on No. 28 gage galvanized sheets. Other jobbers are quoting 7.50c on plates and ½c to 1c higher on sheets. Demand continues urgent from all sources and includes large export inquiries.

Movement Still Upward

Cleveland, May 15.—All jobbers now are quoting 7c on plates in this district, those interests asking 6.50c having raised their schedule this week. Shapes and bars are unchanged. Shafting is from 10 to 20 on. Sheets continue to rise steadily. Some sellers have put No. 10 blue annealed to 7.50c, but 7c still is quoted by others. These interests also have raised No. 28 black to 8c and No. 28 galvanized to 9.50c.

Detroit Up Again

Detroit, May 15.—Warehouse prices in this district again have been advanced, and in some products the change is by a wide margin. Steel bars from store now are quoted at 4.50c; structural shapes at 5c; plates at 8c; No. 10 blue annealed sheets at 8c; No. 28 black sheets at 8c; No. 28 galvanized sheets at 11c, and hoops at 6c.

William Wieman, Pittsburgh, pig iron, coal and coke dealer, has moved his offices from the Frick building to the Union Arcade building, Pittsburgh.

Contract Coke Sells at $8

Various Sales for Last Half Made on This Basis—Car Supply Has Been Drooping

Pittsburgh, May 15.—Sales of furnace coke for last half shipment at $8, ovens, have removed all doubt as to the position of the market after July. A steel works interest, with blast furnaces in this and eastern territory, has purchased 10,000 tons a month for last half; a central western blast furnace interest has taken 2,000 tons a month for similar shipment, and a smaller tonnage has been sold for delivery after July 1, all at $8, ovens. Higher prices are being talked of. Prices for spot shipment have advanced 50 cents a ton to $8.25 to $8.50, ovens, as a result of the continued scarcity of cars. The supply last week was 50 per cent, compared with 55 per cent for the week before. Yesterday, a 75 per cent car supply was reported, and the supply today is about 65 per cent, with prospects of only a 30 per cent supply tomorrow. Foundry coke has been sold at as high as $10.50 for immediate shipment. Generally, the foundry coke market is quiet. Production of coke the week ending May 5, was 400,097 tons, an increase of 20,319 tons compared with the week before, according to the report of *The Connellsville Courier*.

Spot Furnace Active

Philadelphia, May 14. — Considerable spot furnace coke has been sold in this district the last few days at $7.75 and $8, Connellsville ovens. No contract business in furnace coke is reported. Spot foundry coke has been sold here in small lots at $9 to $10, Connellsville ovens, depending on brand. Contract foundry coke, recently selling at $9, has been quoted by one maker at $9.25, ovens.

Spot Commands $12

Cincinnati, May 15.—Spot Wise county foundry coke is held at $12, ovens, and a considerable number of cars have been sold at this figure. Contract ranges from $9.50 to $10.50. Connellsville foundry coke is quoted for prompt shipment at from $10.50 to $11 and on contract from $9 to $9.50. Connellsville furnace coke from $7.50 to $8, ovens, but no contracts have been made recently, with the exception of a small quantity of 48-hour coke for domestic use.

Spot Fuel Quickly Taken

St. Louis, May 15.—An excellent scattering demand for coke characterized the St. Louis market throughout the past week. All arrivals are being disposed of promptly at steady prices compared with the preceding seven-day period. Consumption by foundries is on a very heavy scale, but most of the more important plants are well covered, and are taking only an occasional car in the open market. There has been no change in the transportation situation, which is characterized as unsatisfactory. Six cars of 72-hour Connellsville foundry coke was shipped during the week to plants in northern Mexico. Consumers in the southwest are reported running short, and in urgent need of supplies.

Southern Output Increasing.

Birmingham, May 15.—Demand for coke shows no recession though the production gradually is increasing. Inquiries are coming in from domestic consumers and for export coke. Mexican negotiations are still on. Furnace coke is quoted from $6 to $8 and the foundry coke from $8 to $10 on old contracts to $12.50 to $15 on small lots and immediate shipment. Conservative coke men express opinion there will be need for all the coke that can be manufactured through the balance of the year and the better portion of next year and longer. Every coke oven possible is being placed in condition for operation in southern territory.

Will Watch Ferro Supply

Committee Appointed to Direct Situation—Government Buys Ferro-Silicon—Ohio Strike Causes Concern

New York, May 15.—Efforts now are under way to mobilize the ferro-manganese situation and to regulate distribution. A committee of twenty dealers and manufacturers has been appointed to act with the alloy committee of alloys of the council of national defense for that purpose. Spot domestic ferro-manganese, in several instances, was sold in the week at $425, delivered eastern Pennsylvania. Asking prices now are much higher and not less than $450 is indicated. A large eastern maker is quoting $425 for third quarter, $400 for last half and $350 for first half. No further sales of English ferro-manganese are reported. It is learned, however, that one British maker has been licensed to export about 1,000 tons to this country.

Several inquiries for heavy tonnages of spiegeleisen are current for last quarter and first half. Sales of several hundred tons have been made at $80 for last half and at $75 for last quarter. One furnace now is quoting $70 on first half. Some business in nearby spiegeleisen has been done at $85, furnace.

The strike at blast furnaces in the Jackson, O., district, is causing much concern to sellers of ferro-silicon here. It is learned that army officials are preparing to take some action toward the termination of this strike in case it is not settled shortly. Some prompt 11 per cent ferro-silicon has been sold here at $65, furnace.

Demand for ferro-tungsten continues fair. Seventy per cent ferro-tungsten is quoted at $2 to $2.15, per pound. Demand for ferro-chromium is fairly active. Sales of 5-ton lots are reported at an average of 20 per cent per pound for 60 to 70 per cent containing 4 to 6 per cent carbon.

Offers $1 for Home Ore

New York, May 15.—Domestic manganese ore is commanding record-breaking prices under new price offer by leading consumers. The new prices are $1 per unit for 49 per cent metallic manganese, delivered in the Pittsburgh district or South Chicago; 98 cent for 46 to 49 per cent; 95 cents for 43 to 46 per cent; 90 cents for 40 to 43 per cent. These prices are computed on the usual base ore, containing not to exceed 8 per cent of silica, or 0.20 per cent phosphorus.

Government Buys Ferro-Silicon

Washington, May 15. — At $190.40 a ton, Niagara Falls, for 1,200 tons for the last half of 1917, and at $224 a ton for 1,200 tons for the first half of 1918, the Electro Metallurgical Co., is low bidder on 2,400 tons of ferro-silicon for the navy department. The metal is to be 80 to 85 per cent.

Strikes Cause Apprehension

Pittsburgh, May 15.—Labor trouble at three blast furnace plants in Southern Ohio engaged in the manufacture of silvery iron and bessemer ferro-silicon, is causing consumers to worry about their supplies. Quotations on lower grades of ferro-silicon have advanced sharply to $70 for 10 per cent for last half shipment; for prompt delivery, this grade is being held at $80, furnace, by some sellers. Eighty per cent ferro-manganese is reported to have been sold at less than $400, delivered Pittsburgh. On the other hand, carloads have gone at less.

(*For miscellaneous prices see page* 1106.)

Want Clear Way for Scrap

Dealers Association Makes United Appeal to Government to Prevent Increasing Blockade—Market Still Strong

Pittsburgh, May 15.—On the claim that iron and steel scrap is essential in the manufacture of munitions, members of the National Scrap Iron and Steel Association met here tonight in an effort to secure representation on the iron and steel subcommittee acting in an advisory capacity to the council of national defense. Officers of the association recommended the appointment of a committee to co-operate with the department of commerce and the defense council in conserving waste materials available for military purposes. Unless railroad officials are directed to place scrap on the preferential list, steel plants in all sections of the country will suffer, according to the dealers. Scrap is beginning to pile up at producing points and outbound shipments from yards are decreasing rapidly. Heavy melting steel is reported to have been sold by railroads at as high as $33; dealers, however, have been unable to obtain more than $28 a ton, delivered. Quotations on low phosphorus No. 1 cast, heavy breakable cast and turnings have advanced from 25 cents to $1 a ton. Eastern consumers are offering to pay premium prices for wrought material, but these offers cannot be considered, on account of the impossibility of moving scrap quickly. The Bethlehem Steel Co. tentatively inquired here a few days ago for a round tonnage of borings.

Market is Calmer

New York, May 15.—The agitated condition which for sometime past dominated the iron and steel scrap market here as well as in other districts, now is disappearing and the market reflects a calm but steady tone. Current demand involves principally foundry grades and wrought iron scrap which are moving freely in small tonnages. There is practically no activity in heavy melting steel. This week's advances are $2 on old steel shafting and $1 on wrought pipe. Grate bars delivered New Jersey points may be quoted about 25c less.

Pittsburgh Offers Most

Philadelphia, May 14.—Demand from the Pittsburgh district for heavy melting steel is not as active as last week. At the same time, the prices offered by Pittsburgh dealers are higher than can be obtained here. A leading eastern Pennsylvania consumer continues in the market for a large tonnage, but its offers do not interest the dealers. This mill, however, is understood to have taken 2,000 tons of heavy melting steel at $24, delivered. Demand for No. 1 cast and malleable which compete with pig iron is active and these grades are strong. Railroad wrought and its substitutes also are in good demand. Price advances this week are $1 on shafting, No. 1 cast and malleable, and 50 cents on No. 1 forge, bundled sheets and wrought pipe. An equivalent of $24, delivered eastern Pennsylvania, was offered for wrought pipe.

Market is Unsettled

Buffalo, May 15. — Reports from Washington of possible direct government supervision of mill operations has had a disturbing effect upon the scrap market. Deals are in abeyance and both yards and consumers are apparently holding off temporarily. This attitude has tended to retard further price advances on most grades. Railroad malleable, however, has gone to $27.50 to $28.50 and locomotive grate bars to $18 to $18.50.

Market Again Hardens

Cleveland, May 14.—The market for iron and steel scrap has hardened with an advancing tendency. It is believed by dealers that the scarcity and decreasing supply of pig iron must operate to force scrap upward. This territory however shows no signs of any immediate demand for scrap to counteract low pig iron stocks. Most of the important consumers are well stocked up. Any advance here largely would be a reflection of higher levels in other trading centers. Railroad car wheels have been marked up $1.50 to $24.50 to $25 per gross ton; No. 1 busheling, 50 cents to $11.25 to $11.75 per net ton; pipes and flues $1 to $20 to $21 a net ton; No. 1 machine cast is stronger by $1 a net ton and is held at $23.25 to $23.50. Heavy melting steel continues to be quoted at $27.50 to $28 per gross ton. The traffic situation has cleared considerably. Some dealers have reported however that under the preference in transportation given to iron ore, coal, coke, etc., the number of cars they can ship to a single consumer is being restricted.

Chicago Market Strong

Chicago, May 15.—Although the market for iron and steel scrap in Chicago has been comparatively quiet, the disinclination of consumers to buy has not weakened prices and advances continue on a number of grades. Large demand on part of ordinary consumers and rumors that users of heavy steel scrap are about to enter the market have held the situation firm. Railroad offerings are not up to the usual mark, which is another factor of strength. The Illinois Central railroad recently disposed of 1,000 tons of No. 1 steel rails. The Chicago, St. Paul, Minneapolis & Omaha railroad is offering 1,250 tons, the Soo Line 1,858 tons, the Union Pacific railroad 836 tons, and the Chicago Great Western railroad 350 tons.

Cast and Wrought Up

Cincinnati, May 15.—Dealers report an advance in both cast and wrought scrap and also that business is more brisk than earlier in the month. Offerings of scrap from different sources are only fairly good, which in a measure has something to do with diminishing yard stocks.

Pig Iron Scarcity a Factor

St. Louis, May 12.—The scarcity and dearness of pig iron has been a stimulating factor in the local scrap iron and steel market. Melters are seeking eagerly all of certain grades they can find, and are using this material to help out on hurry-up orders for finished products. Dealers report the market generally strong and steady mainly but some stiff advances have taken place in certain grades. Railroad scrap is moving a little more freely. The tonnage arriving at St. Louis however still is short of local consumption. Buyers are taking about everything offered by dealers. Owing to scant stocks, transactions have not been impressive. The only railroad offerings during the week were: Chicago, Milwaukee & St. Paul, 1,200 tons; Union Pacific, 850 tons, and a small open list by the St. Louis and San Francisco.

Holds Considerable Strength

Birmingham, May 15.—Despite expectations of a weaker condition and some fluctuations for a few days, the scrap iron and steel market shows considerable strength. Dealers report a steady inquiry though consumers want concessions. Failing to get these concessions, some purchases are being made constantly by consumers. No. 1 machinery advanced in the week to $22 to $23, and car wheels to $20 and $21. Predictions have been made now for a fortnight and longer that the scrap market was due some sort of collapse, but nothing has happened so far to disturb the general conditions.

(*For miscellaneous prices see page* 1106.)

Seek Low Ship Steel Price

Shipping Board Wants Preferred Terms on Big Tonnage—Eight Boats Placed—May Take British Space

Washington, May 15.—Prices and tonnages of steel for steel and wooden ships to be built under the direction of the United States shipping board are being discussed by that body with steel manufacturers. The board is believed to be trying to get plates at 2.90c and shapes and bars at 2.50c, the prices for 1917 delivery conceded to the navy and war departments by the steel makers. There appears to be considerable doubt that the board will be able to get these prices. It is thought probable that the plan of placing steel by the board will be the same as that for the war and navy departments. These departments make out their requirements, forward them to the Washington office of the committee of the American Iron and Steel Institute. The latter then makes recommendations as to the distribution among the mills.

Structural Soon to Move

One of the first structural lots of about 30,000 tons will be for the eight 8,800 ton steel vessels which have been awarded by the shipping board as its initial contract to the Los Angeles Ship Building & Dry Dock Co. Two of the ships are to be delivered in May, two in June, two in September and two in October of 1918. Of the four standardized types of steel ships which the board now proposes to build those going to the Pacific coast represent the largest. The smallest probably will be of 3,500 tons.

The board also is asking for 250,000 additional steel and wood tonnage for the earliest delivery possible. The board hopes to have built within the next 18 months 1,000 steel and wood ships of more than 3,000,000 aggregate tonnage. While it is planned to build a total of 1,000 wood ships the number of steel vessels will be determined by the capacity of ship yards and the ability of steel mills to make needed deliveries.

The British government has offered to abrogate all ship building contracts in this country to release yard facilities for the United States government.

Molding and Furnace Sand Go On Preferred List

Washington, May 15.—Instructions have been issued by the commission on car service of the council of national defense to the railroads of the country to include molding and furnace bottom sand in the list of commodities which are to be given preferred car movements. The preferred movement of this material is to be confined to the next six months only. Ample supply of this sand, it was pointed out to the commission is necessary to make possible production of steel and iron products which will be required in large quantities in connection with the national defense. The foundries of the country have been operating on a hand-to-mouth basis because of a lack of rolling stock to move the sand. This has resulted in some plants being forced to shut down, as well as in a shortage of castings of all kinds. The facts were laid before the commission by a committee representing the Ohio Sand Traffic Association.

Refractory Makers Offer Their Best Service

Pittsburgh, May 15.—The 62 members of the Refractories Manufacturers' Association, with a combined capacity of about 1,000,000,000 refractory brick annually, have offered to give preference to requirements of the government and of interests making munitions. A committee has been appointed to co-operative with the national defense council. An industrial survey was conducted some time ago, to make it possible to mobilize the refractory industry quickly. Several manufacturers have advanced minimum quotations $5 all along the line. Pennsylvania fire clay brick is being held at $45 per thousand by some makers.

Wire Rope Industry Put on War Basis

Manufacturers of wire rope at a meeting at New York May 11, prepared to mobilize their industry for meeting the war requirements of the United States and its allies. The meeting was held at the direct request of government officials. The following committee was named to represent the industry and to assume charge of distribution: Frank Baackes, vice president, American Steel & Wire Co.; Karl G. Roebling, John A. Roebling's Sons Co., Trenton, N. J., and J. Broderick, Broderick & Bascom Rope Co., St. Louis. The need for a continued supply of wire rope of various industries apart from war purposes also was given attention. The mining, lumber, ship building and other industries which are vitally important to the successful conduct of the war, are large consumers of wire rope. Such industries, it was decided, may continue to count on getting their full requirements. The manufacturers of steel wire are about to hold a meeting in New York to mobilize along similar lines.

Bridge Builders Offer to Assist Government

Co-operation to assist the government in carrying out war programs which require large amounts of fabricated steel for ship and building purposes has been offered by the Bridge Builders and Structural Society. The following resolutions were passed by the society at a recent meeting in Chicago:

Whereas, it is already apparent the government will need directly and indirectly large amounts of fabricated steel, and

Whereas, prompt delivery of such steel is of the highest importance, and such delivery cannot be made without systematic co-operation and organization of the industry.

Therefore be it resolved; that the Bridge Builders and Structural Society appoint a special committee to co-operate with the several departments of the government and with all commissions, committees and parties connected with furnishing supplies to the government, to the end that the facilities of the fabricating plants of the country may be most efficiently utilized.

In compliance with this resolution a committee of six members of the society was appointed representing all sections of the country east of Mississippi river. This committee has started active operations.

Will Take Shell Bids

Washington, May 15.—The bureau of ordnance, navy department, Washington, will open bids May 23 for 65,000 6-inch; 250,000 6-pounder and 165,000 3-pounder common shells; 3,000 14-inch; 1,200 13-inch; 1,000 12-inch; 2,000 8-inch; 4,000 6-inch and 1,000,000 1-pounder target practice shells and 25,000 1-pounder anti-air craft shells.

Henry M. Howe is Awarded John Fritz Medal

In recognition of his distinguished services in the field of metallurgy and metallography of iron and steel, since 1871, Professor Henry M. Howe has been awarded the John Fritz medal by the board of awards of the United Engineering Societies. The presentation meeting was held in New York City May 10, Ambrose H. Swasey, chairman of the board of awards presiding. Addresses were delivered by Dr. Rossiter W. Raymond, who for many years was secretary of the American Society of

Mechanical Engineers and now is secretary emeritus, and by Dr. Ira N. Hollis, president of the American Society of Mechanical Engineers, Professor Albert Sauveur of Harvard university made the presentation speech. Professor Howe is noted for his discoveries and his writings in his chosen field. The award of the John Fritz medal is added to a long list of honors conferred upon him in this country, England, France, Russia, Germany and Sweden.

Amazing Tonnage

Of Ships Can Be Built With Proper Effort, Says Grace

"Proper co-operation between the government and various ship building companies with provisions for an adequate supply of raw material will make it possible for the United States rapidly to construct an amazing tonnage of new ships," said President E. G. Grace, of the Bethlehem Steel Co., in a dinner address before the Wilmington chamber of commerce, at Wilmington, Del., May 11. These ships may not be perfect ones, but they will "do the trick" and will render adequate assistance to our allies, according to the Bethlehem steelmaster.

Mr. Grace highly praised the intelligence, thoroughness and unselfishness shown by members of the administration and by many business men whose advice has been called upon in the present hour of emergency. What the Bethlehem Steel Co. is doing to co-operate with the government in all the latter's war plans was told in some detail. "To commandeer any of the Bethlehem Steel Corporation properties is unnecessary," said Mr. Grace, "since they are at the service of the government at its bidding. Furthermore, their facilities will be enlarged in any direction necessary to meet the nation's requirements.

"At the beginning of the war in Europe the shell making capacity of the whole United States was practically negligible," said Mr. Grace. "At the present time the Bethlehem Steel Co. has capacity for 1,000,000 rounds of ammunition per month. At the beginning of the war, facilities for the making of field guns in this country were insignificant. At that time the entire English army had only about 600 field guns. At the present time our works at Bethlehem are turning out 100 finished steel guns per month, as well as over 2,000 gun forgings which can be completed elsewhere.

"Bethlehem is not only the largest ordnance plant in the country. It also has the largest ship building facilities. Lloyd George said that the three greatest needs in the present crisis are, 'First, ships; second, ships; and third, ships!' Let no one believe that these ships cannot be built. Ship yards can be established at every deep waterway point in the country where materials and labor can be quickly assembled. We ought to build all the wooden ships we can possibly make, but we need also to build a very large number of steel ships. We of the Bethlehem company are prepared to co-operate with our government to the utmost in building the necessary tonnage of ships, and to accomplish an achievement which will do more than anything else to defy Germany's efforts to terrify the world with her submarines."

Northern Mines

Not Yet Transferred to Jones & Laughlin—Trustees Will Ship 1,000,000 Tons

St. Paul, Minn., May 14.—Negotiations for the transfer of the Agnew, Mississippi and Hill Annex mines on the Mesabi range by the Great Northern Ore trustees to the Jones & Laughlin Steel Co., Pittsburgh, have not yet been completed, it was authoritatively stated in St. Paul today. It is expected, however, that the final papers will be signed in a comparatively short time. Only a few details remain to be considered.

The transfer of the Dunwoody pit, near Chisholm, to the Inland Steel Co., Chicago, has been formally negotiated. The relinquishment of these properties in no way will affect the operating organization of the Great Northern Ore trustees this year, as none of the properties concerned ever have been operated by the Great Northern interests.

The Arthur Iron Mining Co., as the operating end of the Great Northern ore organization is called, is shipping this year from the Thorne, North and South Uno and Harold mines. The Arthur Iron Mining Co., expects to forward about 1,000,000 tons of ore this year. More would be shipped if boats could be obtained. A large amount of this ore is already in stockpiles and shipments, therefore, will not be affected by labor shortage on the range.

Engineers Get Ready

The United States engineers' regiment, of Pittsburgh, composed largely of scientific men, has been directed by Secretary of War Baker to equip itself for immediate service in Europe. Many mechanical, electrical and construction engineers, identified with the steel trade in western Pennsylvania, eastern Ohio and West Virginia, are members of the regiment, commanded by Col. Edgar Jadwin of the United States engineers corps for the Pittsburgh district. It is understood that the regiment will be used for reconstructing railroads and bridges in devastated sections of France.

Another Record

Broken by Steel Corporation in Total of Unfilled Orders

New York, May 12.—Previous records of unfilled orders on the books of the United States Steel Corporation again have been shattered by the report as of April 30. This showed total bookings of 12,183,083 tons, an increase of 471,439 tons during the month of April, which is equivalent to a gain of slightly more than 4 per cent. Comparison with the unfilled tonnages of previous months follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

To Make Ferro

Various Furnaces Being Arranged to Increase Home Output of Metal

A considerable increase in the domestic production of ferro-manganese is represented by the plans laid out for starting or restoring various furnaces in the making of this metal. The Sheridan furnace at Lebanon, Pa., of E. J. Lavino & Co., Philadelphia, is expected to resume on ferro-manganese early in June. The furnace now is being relined. The Vesta furnace of the Lavino firm at Marietta, Pa., is expected to blow in on ferro-manganese probably in July. The Lochiel furnace of Edw. E. Marshall at Harrisburg, Pa., is to be blown in on ferro-manganese in 60 to 90 days. The Newport, Pa., furnace of Mr. Marshall, which recently was making 60 per cent ferro-manganese, went on 80 per cent ferro-manganese April 25.

The Cleveland office of the American Bridge Co. has been moved from 1542-45 Rockefeller building to the Guardian building.

The Collier Motor Truck Co., Sandusky, O., has received a very large order for trucks, which is said to be the largest of any kind ever placed in that city.

Ingot Production

In April Compared with Output in Previous Month

Additional reports reaching *The Iron Trade Review* from independent producers of steel ingots afford a more complete and accurate index to the comparative rate of operations in April compared with each of the first three months of the year. The April production is shown to be more than 3.3 per cent less than that in March.

Steel Ingot Output

Reports from Same Companies.

	Gross tons. April.	March.
Basic O. H. ingots..	900,768	946,837
Acid O. H. ingots....	32,555	35,745
Bessemer ingots	184,607	212,765
Electric furnace ingots	5,980	5,902
Totals	1,123,910	1,201,249

In the accompanying table, reports received from the same companies in March and April are shown. These companies produced 1,123,910 tons in April and 1,201,249 tons in March, a loss of 77,339 tons. On the basis of average daily production, these companies turned out 37,464 tons of steel ingots every day in April and 38,750 tons daily in March, a loss last month of 1,286 tons, or more than 3.3 per cent.

As shown in the complete figures published last week, all companies reporting in March had an average daily production of 39,818 tons. The same companies averaged 37,342 tons daily in February and 37,972 tons daily in January.

The loss last month of 3.3 per cent in steel ingot production compares with a gain of more than 5 per cent in pig iron production made in April.

Reopen Ore Cases

Asks Steel Corporation of Interstate Commerce Commission

Washington, May 15.—Re-opening of the iron ore rate cases, affecting the readjustment of districts, prices, rules and regulations governing the transportation of iron ore from Lake Erie ports to points in western Pennsylvania, Ohio, West Virginia and Kentucky, is asked in a petition filed with the Interstate Commerce Commission by Charles S. Belsterling, general traffic attorney for the United States Steel Corporation, in behalf of the National Tube Co., the Carnegie Steel Co., and the American Steel & Wire Co.

The petition seeks a vacation of the recent order of the commission. Request is made that New Castle, Pa., which is to be placed in a new district, be restored to the Youngstown group. On the spotting charge the petition points out the expense of delivery of iron ore is not sufficient to justify an addition to the line haul rate. A separate charge for the customary placement of cars, affecting certain furnaces in the Ohio and western Pennsylvania districts, is declared to be tantamount to charging the industry double for the same service. In the recent order it is stated the line haul rates have been increased to some points and reduced to others. These changes, it is asserted, are brought about by disturbing the long established groups, and by the spotting charge, and it is urged that further increase in ore rates should be upon an equitable basis.

Vigorous protest is made against carriers being not required to make allowances to private docks for handling ore from the rail of the vessel to the cars, while charging 6 cents per ton at railroad-owned docks. This order is declared to be unlawful.

Many Thousands

Of Trucks, Autos and Cycles About to Be Ordered

Washington, May 16. (By wire.)—Bids will be opened soon by the quartermaster depot of the war department at Chicago for 20,000 motor trucks. The war department will open bids on June 8 for up to 1,000 automobiles; on June 10 for up to 35,000 1½-ton and for up to 35,000 3½-ton motor trucks; on June 11 for up to 200 ½-ton and for up to 200 ¾-ton motorcycles complete, and for up to 5,000 motorcycles with side cars. At least 40,000 motor trucks will be purchased.

The American Radiator Co. has offered to furnish the war department 12,000,000 feet of radiation for shelter camps for new American armies. The department, however, has not determined whether camps will be heated by steam, hot air or stoves.

The Pennsylvania Engineering Works, New Castle, Pa., on May 6 advanced wages 10 per cent.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, May 15.—Rapid advance in the price of tin has been the outstanding feature of the metal markets of late. Seven days ago spot Straits was quoted £232 12s 6d on the London metal exchange; today the close in London was £253, a net advance of £20 7s 6d for the week. In the New York market, spot Straits was quoted 59.50c, a week ago; today the price was about 66c. The sharp increase is due in part to expectation of a duty of 10 per cent to be imposed on imports, as provided in the new war revenue bill. It is also believed that there may have been losses at sea of which the trade on this side knows nothing. The statistical position of the metal is extremely strong; the world's stocks showed sharp reduction during April, while arrivals in this country since May 1 have amounted only to 2,555 tons.

Inquiry for spelter has been extremely light. The most interesting development of late in connection with the spelter market is the announcement by the zinc committee of the advisory board of the council of national defense that the government's present zinc requirements would amount to 6,703¾ tons of Grade A; 3,440½ tons of Grade B and 225 tons of Grade C, at 11.50c, 11c and 9c respectively. Current prime western quotations in the general market follow: Prompt, May and June, 9.25c, St. Louis basis; July, 9.12½c to 9.25c; third quarter, 9c to 9.25c.

The copper market has been inactive, but the low prices which were talked of a week or so ago have vanished. Practically no third quarter electrolytic appears available at less than 29c, cash, New York. Electrolytic quotations follow: Spot and May, 32.50c, cash, New York; June, 32c; July, 30.50c; August, 29.50c; September, 29c. Prompt prime lake copper is nominally quoted about 32c to 32.50c; casting copper is stronger and nearby supplies seem scarce; prompt casting is quoted about 31c.

Pending the government's decision as to the amount of lead it will require, the leading interest has been withholding supplies from the market and independents have been selling carefully. The market developed a runaway tendency, however, and prices reached the highest level on record, near the close of last week, May shipment metal selling above 10.50c, St. Louis. The high prices discouraged demand, however, and the market reacted to about ⅝c to ¼c. Present quotations are about as follows: Prompt and May, 10.37½c, St. Louis basis; June, 10.25c; July, 10.12½c.

Antimony also has been extremely active and higher prices have developed for futures, as consumers have been covering their needs as far ahead as October. Much speculative trading also has been in evidence. Spot antimony is quoted about 26c, today. Quotations for Chinese and Japanese brands for future shipment from the far east, are as follows: May, 16.75c to 17c, in bond; June, 16.25c to 16.50c; July, 15c to 15.50c.

The aluminum market continues dull but prices are steady. Quotations follow: No. 1 virgin, 62c to 64c, No. 1 remelted, 98c to 99 per cent, 58c to 60c; No. 12 alloy, 42c to 44c.

(*For miscellaneous prices see page* 1106.)

Asphyxiation By Blast Furnace Gas

The Enforcement of Adequate Rules and the Installation of Protected Ladders, Stairways, and Other Safety Appliances Reduce the Liability of Serious Accidents Resulting From Suffocation

BY FREDERICK H. WILLCOX

BLAST-FURNACE gas is peculiar in that it is very poisonous and under certain conditions, as when it has been cleaned, is without color or odor by which it may be detected. Gas is practically always present about the top and bottom of the furnaces, frequently in such small proportion that it is not evident to the physical senses, but at the same time in sufficient volume to cause asphyxiation if breathed for 20 or 30 minutes. Proportions sufficient to cause asphyxiation or gassing also occur with more or less frequency all along the route of the gas, Figs. 10 and 12, at the stoves and boilers when they are taken off for cleaning or repairs, inside of gas mains, downcomers, and other parts of the gas-main system, at sand or goggle valves, and during repairs to the charging equipment and stock line.

Making Blast Furnace Work Safe

In the Oct. 19 and 26, 1916, numbers of The Iron Trade Review, we presented an article describing the dangers of blast furnace work and prescribing methods of reducing the chance for accidents. The accompanying article, which is an abstract of Technical Paper 106, Department of the Interior, Bureau of Mines, deals with a phase of blast furnace work, the danger of which is not generally recognized. Mr. Willcox shows that although the presence of carbon monoxide must be accepted as one of the necessary evils of blast furnace operation, it is possible to guard against asphyxiation so effectively that accidents are reduced to a minimum.

Why Gas is Poisonous

Blast-furnace gas contains 20 to 30 per cent by volume of carbon monoxide. The poisonous effect of carbon monoxide on man is caused by its peculiar power to combine with the red coloring matter—the hemoglobin—of the blood. This red coloring matter also combines with the oxygen in the air breathed into the lungs and distributes the oxygen to the different parts of the body. The affinity of the corpuscles for carbon monoxide is about 250 times as great as for oxygen; consequently when the blood is saturated with this gas it will not take up oxygen, nor will it expel carbon monoxide so long as there is enough of it in the air to prevent combination with oxygen. Therefore, when a man is breathing air containing carbon monoxide the blood will continue to absorb it, and in just that degree it will decrease the power of the blood to supply the body with oxygen.

A method for detecting the presence of carbon monoxide are described by G. A. Burrell, bureau of mines, as follows:

"One or two drops of blood from the finger are diluted with water until equal portions of the solution placed in 100 cubic centimeter test tubes have a buff-yellow color; one of the tubes is taken into the mine, and at the place where the air is to be tested about 50 cubic centimeters of the blood solution is poured out, the mine air taking its place. The tube is then corked, taken to the surface, and gently shaken for 10 minutes. If the air contains carbon monoxide, the pink color caused by the presence of carbon monoxide hemoglobin is detected by comparing the solution with the normal blood solution in the other tube."

Too much depends upon the character of the gas, whether it has been confined or cleaned, its origin, and on the persons concerned, to place any reliance on evidence appealing to the senses, nor can any reliable rule or direction be made in regard to working in gaseous air except to keep out of it if it is either smelled, seen, or suspected, unless the proper precautions are taken.

Accidents on the Bustle Pipe

In at least three instances men have been fatally overcome on bustle pipes. One man was found lying on a bustle-pipe platform dead. In another case a stove tender inspecting water discharges was partly overcome and fell from the

FIG. 1—STEPS TO FURNACE TOP—NOTE WIRE NETTING

FIG. 2—LOCKED GATE AT BOTTOM OF STAIR TO FURNACE TOP

FIG. 3—A WELL-ARRANGED FURNACE TOP

Note the three means of ascent and descent—by walk at left from stove, by stair from below at left, and by stair at right from cast house. Note also railings on stairs and walks, the high toe boards, and the perforated construction, by which the workmen can be seen from below.

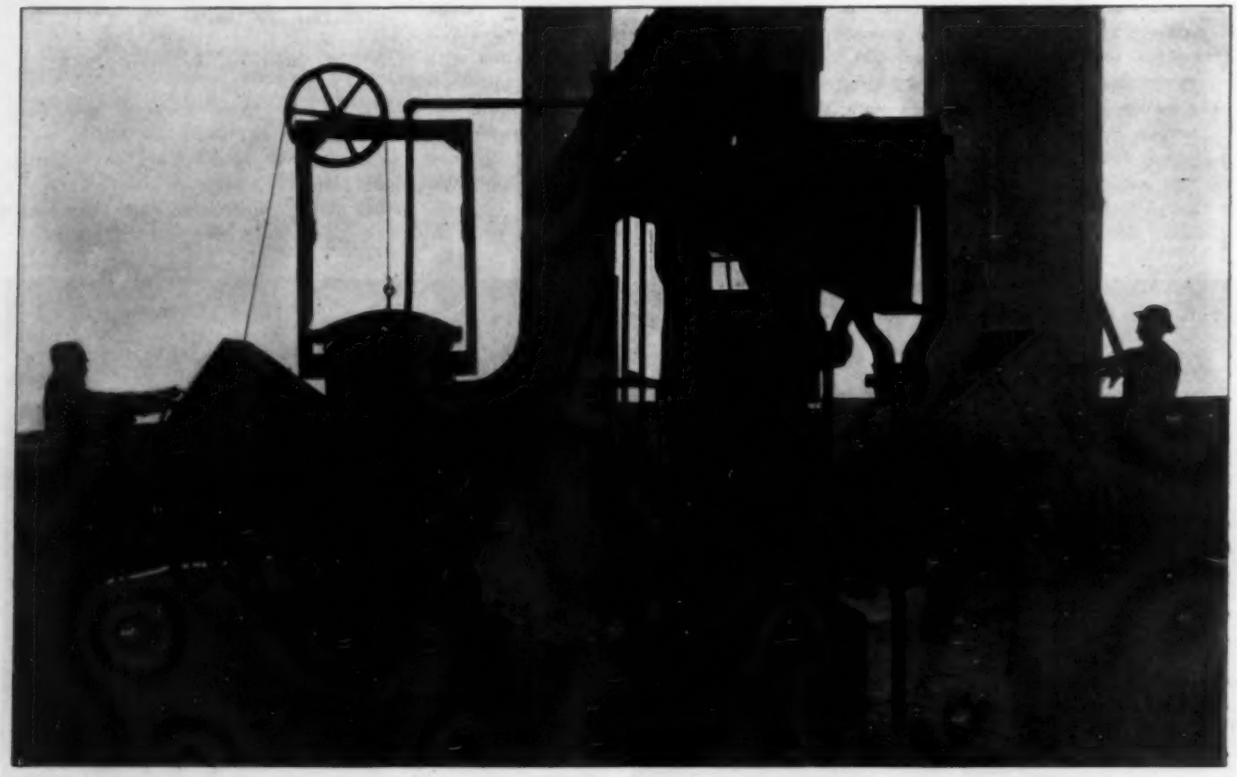


FIG. 4—TOP FILLERS DUMPING ORE INTO OLD STYLE OF FURNACE

Note dimness caused by gas rising from the hopper.—In one instance a top filler was overcome with gas from a leaky explosion door and fell into the hopper.—The practice of suspending a lighted coal or coke brazier at the side of the hopper of old furnace tops is preferable to the practice of lighting the gas with burning waste or coke at each lowering of the bell. The first method obviates the possibility that gas escaping from about the bell and hopper-extension junction may accumulate by neglect to keep it lighted.

bustle pipe with fatal results. In the third case one of the cast-house crew attempted to bring a man, who had been partly overcome, down a ladder from the bustle pipe and let him fall.

Men should not be allowed to go up on the bustle pipe to examine the water discharges, or valves, without notifying either the keeper, one of the tuyere gang, or the furnace blower; and if the job is likely, or proves to be, a long one, arrangements should be made for the men to relieve each other. It should be impressed on the man notified that he must remain on watch, or if it becomes necessary for him to leave his post, that he must arrange for some other man to replace him. It can not be considered essential that two men be required to go on the bustle pipe for each and every job. One man who is familiar with the work and acquainted with the possibility of there being excessive amounts of gas thereabouts is sufficient, provided always that some one has been notified and that the one so notified stays on watch. It should be impressed on every employe that if he should feel the slightest dizziness, weakness, or other symptoms of gas poisoning while working about he ought to come down immediately, not necessarily because he is in imminent danger of death, for he is not if a watcher is stationed below and a railed platform is provided, but to prevent any possibility of his receiving a fall or burn through excessive dizziness, loss of muscular control, or unconsciousness. Nearly all of the deaths from gas at the bustle pipe have resulted from there being no one in particular who knew there was anyone on the bustle pipe.

Safeguards

As men may become gassed while working on the bustle pipe to such an extent that they lose control of their hands or legs, it is essential to safety that bustle pipes on which men must go several times daily, be provided with platforms with a 6-inch toe board, intermediate rail, and handrail at least 3 feet 6 inches high. The platform preferably should not rest directly on the bustle pipe, but be supported on it by angle irons so that the floor plate will not become hot enough to burn a man if he should fall on it. Access to the bustle-pipe platform should preferably be by a stairway protected with handrails leading up from inside the cast house, and this stair should be the only means of access. To make sure that no one can go up on the bustle without being noticed a swing gate that sounds an alarm on being opened should be placed near the top of the stairs or ladder. The device shown in Fig. 1 is in use by the Illinois Steel Co. To get up on the platform the water tender or other workman must open the gate, which, on being swung back, engages a catch that releases a steam or air whistle or electric gong, which continues to sound until the man comes down and closes the gate, thus calling the attention of everyone in the cast house to the fact that someone is working on the pipe. If the alarm sounds too long someone should investigate, but its prime purpose is to signal the keeper or hot-blast man to watch for the workman until he comes down. Such a device is recommended as practicable to all who wish to make this particular part of the furnace equipment safe.

Repairing Cooling Plates

Construction in which cooling plates are set in the lining at varying heights above the mantle, with the inlet and discharge pipes through the shell, requires occasional attention. When leaks develop or are suspected, it is often a most tedious and baffling task to determine which plate has failed, as the plates are always connected in horizontal or vertical series, and to detect a plate leaking water into the furnace requires breaking the connections from the discharge back to the feed pipe unless the leaky plate betrays itself by steaming about the inlet and discharge lines. Such work, except in rare instances, must be done in a gaseous atmosphere because of gas leaking from about the inlet and discharge pipes and rising from about the mantle.

Inasmuch as men engaged in work upon high platforms about the jacket are likely to be out of sight of watchers on the cast-house floor level, particularly when they are at work on the side away from the tapping hole, two men should always be assigned to even the most trivial job, and a third man stationed as a watcher if it is necessary for the two men to work close to the furnace shell at the same time. The watcher, either of a two-man or of a six-man gang, should be stationed where there is no gas and in a position to keep the one or more workers in sight.

Permanent galleries with rails and toe boards, so situated as to permit easy access to the plates, should be installed; with permanent means of approach by stairs with hand rails, as shown in Figs. 1 and 2. It is often impracticable in old plants to construct stairways to the plate platforms, but whenever such is the case, a steel ladder with a safety-cage attachment should be provided as a means of approach. Until such time as the plant can install guarded stairways or caged ladders to elevated platforms where they are not provided, men going up on such platforms to work in proximity to gas should be required to take up with them a life belt, or harness, and life line.

Blast-furnace tops, Fig. 3, are never tight and they are notoriously dangerous. Mechanically filled furnaces, however, require men on top only at infrequent intervals—oilers once a day for 10 or 15 minutes to oil and inspect sheaves and brasses; riggers and millwrights once or twice a week to inspect the bells and hoppers; cleaners and repair gangs at occasional intervals to clean the top or repair and adjust sheave wheels, brasses, explosion doors, bleeder valves, hoppers, and bells.

Gas is always escaping from about the try hole and may be and usually is escaping from one or all of the following: Gas seal doors, floor plates, explosion doors, and warped, imperfectly seated, or off-center bells and seats. The room available on the top platform is sometimes scant, access to sheave-wheel platforms is most frequently by ladders, the platforms themselves are largely over the receiving hoppers and in some cases the bell cylinders are also over the hoppers. Automatic distributor mechanism, telltales and rodding devices require attention, and such work as inspecting bells and hoppers, removing lumps of ore or scrap, barring ore, replacing hoppers or wearing plates, and making occasional repairs and overhauling has to be done largely in gaseous air.

Asphyxia has happened in a variety of ways: To an electrician changing carbons on an arc light on the sheave-wheel platform; to a pipe fitter replacing a fitting on a bell cylinder; to a stock-house laborer "spelling off" a top filler; to a laborer engaged in cleaning the top platform; to an oiler who fell from the sheave-wheel platform to the charging platform in attempting to get down when partially overcome with gas; to a rigger repairing a telltale on the top rigging; to his helper who tried to rescue him; to a top filler, Fig. 4, who was overcome with gas from a leaky explosion door and fell into the hopper; to a millwright who fell down the steps from the furnace top while partially overcome; to another millwright who was found on top overcome with gas; to seven men who attempted repairs to the small bell rod inside a receiving hopper; and in various other instances noted herein.

Need of Watcher

Workmen should always be required to notify the furnace foreman or blower before going on top even in pursuance of their routine duties of oiling or inspection, and not less than two men should go on top even for minor jobs. One man should act as a watcher, remaining away from the furnace top, out of range and danger of gas; for example, on the No. 2 stove in such a position that he can watch the man or men at work. Oilers should be instructed not to go on oiling platforms above the bells without first notifying the

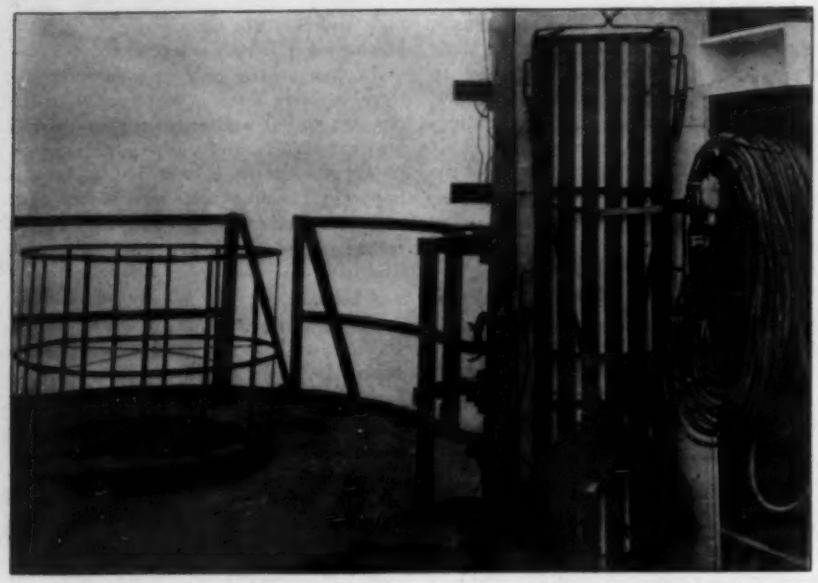


FIG. 5—EMERGENCY STRETCHER AND TACKLES ON TOP OF BLAST FURNACE STOVE—GUARD FOR MANHOLE

bell operator not to open the bells until he receives a signal from them to resume charging. If it is possible to do so, the switches or levers that operate the bells should be locked or blocked in closed position before the oilers go about the bells, to prevent the accidental lowering of either bell through misunderstanding.

Whenever it becomes necessary for a foreman to take the labor gang up to clean off the furnace top, precautions similar to those described for routine oiling and exterior inspection should be followed. It is usually best not to have a fixed day for this job, but to select one when there is a good breeze. The foreman in charge should stay continuously on top during the work.

Life lines and belts should be provided and kept in some secure and readily accessible place on top of the stoves, for use in case it becomes necessary to rescue a workman from the top rigging, and also for use by anyone who has to venture for repairs into an atmosphere that may become gaseous, notably on the top rigging, or inside the gas seal or hopper.

An appliance that has been introduced at the Lucy furnaces, and which should be a feature of safety equipment at all skip-filled furnaces, accessible only up the skip incline, is a stretcher, Figs. 5 and 6, suitably made for securing in position any man overcome by gas while on top and for lowering him to the ground. It is to be recommended in consideration of the fact that men occasionally become delirious when gassed, and resist the men attempting to get them down off the top, or are so helpless as to be brought down the skip incline only with the greatest difficulty.

FIG. 6—FIRST-AID CREW LOWERING ASPHYXIATED MAN FROM FURNACE TOP IN AN EMERGENCY STRETCHER

Alarm Gong

To enable watchers, or an inadequate number of men, on top to summon assistance in case of need, it is essential that there be provided means for attracting some one's attention, rather than having the men under the necessity of shouting down to the yard or trestle at randon. A gong is preferable, located at the skip operator's post and operated from the stove platform, together with a speaking tube or telephone for communication between these points. The bell or skip operator should remain on post continuously so long as there are men on top. It is even better to have an additional gong in the cast house, because some one is always on duty there.

The illumination of furnace tops is occasionally deficient, considering that many types are subject to derangement and delay on account of parts getting out of adjustment. Infrequently the stock-house crew and sailor gang must go up into the top rigging at night when the only light available is a single arc, or cluster of incandescent lights, arranged primarily to light the top of the skip with little attention directed toward adequate illumination of sheaves, bell cylinders, valves, or operating mechanism. Work of this nature, though infrequently required, is hazardous because of the gas and the fact that work on elevated structural construction must at times be performed away from platforms provided for routine duties. A number of plants keep an emergency set of incandescent clusters with extension cord and plug, for use at such times, at the office of the stock-house foreman or on top. At least one plant is considering the advisability of placing a low-intensity searchlight on the stove near the furnace to illuminate the top when men must work in the rigging at night to make emergency repairs or adjustments.

Repairing Furnace Linings at the Stock Line

Work at the top is extra hazardous when failure of the lining at the stock line makes it necessary to bank the furnace for some hours or days in order to renew the lining. Two fatalities have been noted from work in this connection.

This work is infrequently done, and many superintendents prefer to blow out the furnace rather than to attempt it, believing that any repairs of this nature will at best be only temporary, that the work is too hazardous, or that too much importance is attributed to the detrimental effect of the wear of the lining at this point, provided it does not extend back so far that the shell gets hot.

Precaution Makes Repairs Safe

In one plant, in repairing linings, all open cracks in the brickwork of the bosh are luted up, the tuyeres are tightly plugged with clay, and every precaution is taken to insure that the minimum quantity of air enters at the bottom and consequently that the least amount of gas is given off at the top. The furnace was blown down to 40 feet and was filled with the blast off. The last charge consisted of a double round of coke followed by a double round of Mesabi iron ore. The gas was lighted on top of the stock before the gas seals, hoppers, and bells were removed. When these had been removed, the gas was extinguished, a ladder lowered, and two men with life lines attached went down and quickly dug a hole in the center where the ore was thinnest, uncovering the coke to a depth of about 1 foot. Another shift went down and placed a 6-inch pipe in this hole and shoveled the ore back about it. A third shift leveled the ore off to some extent, wet it down, tamped it solid, and covered it with loam. The two coke blanks, being comparatively open, permitted a lateral displacement of gas to the center, where it escaped up the pipe. The brickwork was then quickly repaired with no annoyance from gas.

At work in or about hot-blast stoves, the hazard of asphyxiation is from gas leaking from the stove burner, adjacent burners, or mains, from gas working back in the stove while it is being drafted back past the stove, or from the gas being turned into or drafted back through a stove by error or ignorance.

How Some Accidents Happen

A rigger sitting in a boatswain's chair and tearing down the skin wall in a well was overcome with gas, which was being drawn in from a leaky burner through an open burner door, and fell to the bottom of the well. A stove cleaner entered the dome of a stove on which the hot-well doors had been opened to cool the stove off, before the burner door had been closed and gas from the burner, which was leaking badly, killed him. In drafting back through an additional stove, stove tender in a hurry lifted the hot-blast valve on a stove being cleaned. In another instance men working in a stove near the furnace were severely gassed by leakage through the hot-blast valve and seat when the furnace was drafted back through a stove farther from the furnace. A stove tender was asphyxiated by gas escaping from a dust-box door between the down leg and burner valve.

FIG. 7—V-LEG SELF-CLEANING GAS MAIN—THIS TYPE OF CONSTRUCTION ELIMINATES DANGER IN CLEANING

Before the stove cleaners are allowed to enter a stove to clean it, it is becoming accepted practice to shut and lock the gas burner, or burner valve, as shown in Fig. 9. The stove cleaner foreman, blower, or other responsible employe is given this duty. The hot-blast valve is blocked or strapped on its seat by means of the valve stem, this being found preferable to locking the cable winch. When the counterweight is within reach it is blocked up or enough slack in the counterweight cable is otherwise obtained so that the entire weight of the valve is seating it against the valve seat. At a few plants the cable is detached from the hot-blast valve stem. For all practicable purposes, it is sufficient to slack off on the cable and lock the winch. A method of applying a safety lock to the operating wheel of a hot-blast valve is shown in Fig. 11.

After leaks into the stove and negli-

FIG. 8—A RAILING OF THIS KIND IS AN EFFECTIVE SAFEGUARD ON HIGH GAS MAINS

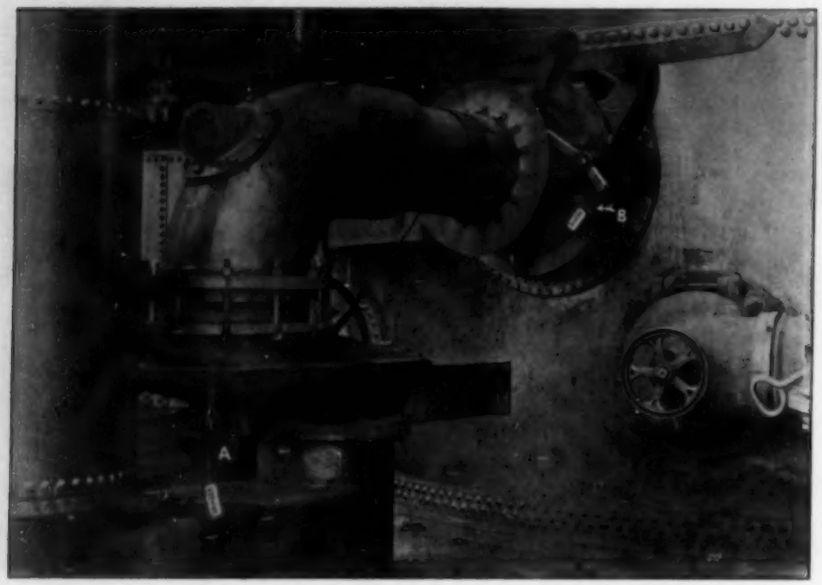


FIG. 9—METHOD OF LOCKING VALVES ON HOT-BLAST STOVE—*A*, FOREMAN'S TAG AND LOCK ATTACHED TO PIN THROUGH BASE OF BURNER VALVE—*B*, TAG LOCKED TO CLAMP BAR ON GAS DOOR

gent opening of valves have been provided against, the following precaution should be borne in mind: To come out of the stove when the furnace is being drafted back past the stove, if the furnace is being given more than two checks to make it slip or is to be taken off for a shutdown. The seal of the hot-blast valve against the seat is at times poor, and as previously shown it is possible for gas to leak back into the stove. The observance of this precaution is not universal, by any means, and is largely determined by local conditions, upkeep of equipment, and the judgment of the furnace foreman. Not a few furnace men believe that, with their plant conditions and practice, it is preferable to be inside the stove rather than outside, when the furnace is slipping heavily. If any one feels the slightest symptoms of gas poisoning he should get out of the stove at once, while he is able to do so.

It occasionally is necessary to enter some part of the gas-main system, beginning at the gas offtake at the furnace top and thence including downcomers, dust catchers, and gas mains to stoves and boilers, or to gas washers and thence to the stoves, boilers, and engines. At these places accidents have been caused by gas leaking down from the furnace top or from adjoining mains or equipment connected to furnaces in operation and containing gas under pressure; by traces or excessive amounts of gas remaining in the main on account of insufficient ventilation or ventilation of too brief duration; and by escape of residual gas held in dry flue dust, wet sludge, old brickwork of excessive porosity, and sand bulkheads.

To put the main in condition for repair work or cleaning it is almost always necessary to blow cold air, by means of the mixer valve, through the main and out of the goosenecks or stocks in order to cool the brickwork as quickly as possible. This necessitates taking down the blowpipes, and therefore it will only be under very strange or unusual circumstances that the exigencies of the work do not necessitate taking down blowpipes, plugging the tuyeres, and blowing through the main, apart from any considerations of safety, and thus making the system absolutely safe as regards leakage from the furnace or traces of gas remaining in the main by the gas having been drawn back in taking the furnace off and shutting down. It is evident that blowpipes should be left down until the work is done.

It is still necessary in some instances to repair or patch the brickwork. One method of repairing downcomers noted by the writer was as follows:

The tuyeres are tightly plugged with clay, and a double charge of fine dry ore is dumped on top of a coke blank. The bleeder, the gas-seal doors, and the farthermost gas burner are opened in the order mentioned, making a suction through the main. After this is

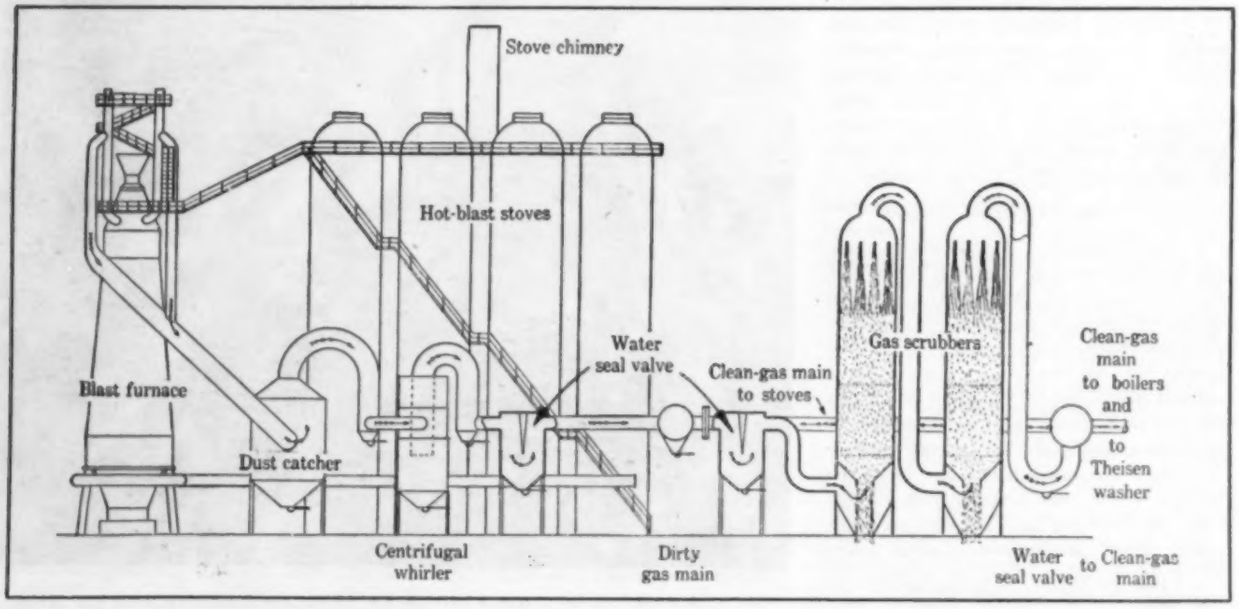


FIG. 10—DIAGRAM SHOWING TRAVEL OF GASES FROM BLAST FURNACE TO STOVES AND WASHERS

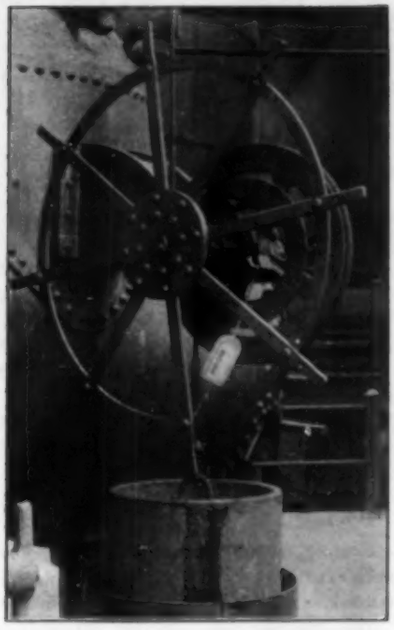


FIG. 11—SAFETY LOCK ATTACHED TO OPERATING WHEEL OF HOT-BLAST VALVE

done, the big bell is lowered. If the gas does not light in the course of 10 minutes, a piece of lighted waste is thrown in, and the gas lighted. The explosion doors are opened and a man stationed on top to see that the gas is kept lit. The experience here has been that there is always a vigorous draft up through the downcomer, and no trouble has been experienced with gas. After the gas has been lighted for about 10 minutes, the doors and dust bell on the dust catcher are opened, and when the downcomer is cool enough to enter, the two doors on it may then be opened.

In repairing dust catchers men are subject to the same hazards from gas as in repairing downcomers, only to a less degree. The primary dust catcher of a series of catchers, as well as the usual single dust catcher, is, at all but three of the plants visited, without any valve between the furnace top and catcher. At certain plants, however, there is a Hamfeldt valve at the base of the downcomer just before it centers the dust catcher. Although the valve is heavy, difficult to handle, and requires additional equipment, it is a handy feature of gas-main equipment when work is undertaken inside the dust catcher, as it gives a sense and assurance of safety from any untoward happening or accident from gas from the furnace top.

Repairing Mains

Work in mains beyond the main dust catcher is, at plants having but one furnace, usually subject to a slight possibility of gas wandering into the main from the furnace top unless precautions are taken similar to those in undertaking work in downcomers or dust catchers. Isolated plants rarely have water-seal or other valves between the dust catcher and the mains, although at some plants gas washers are so arranged that they may be converted into water seals by raising the water level. Many plants having two or more furnaces are also deficient in valves at the dust catcher, the device for cutting the furnace off from others in operation being midway between the stove and boilers. At such plants, whenever it is necessary to go into the mains, the furnace is taken off and suitable steps taken to confine the gas to the furnace top. It should be stated that although accidents in gas mains from asphyxiation may have been caused by gas descending from the furnace top to the mains, no such instance has been encountered; such accidents have evidently been due to other causes.

It is becoming less and less the practice to enter gas mains to clean them. Many believe that the main

Approved Treatment for Suffocation

If a man is overcome by bad air, move him to fresh air as quickly as possible, then loosen his clothing, place him face downward on a blanket or coat spread on the floor. One of his hands should be held straight out beyond his head; the other placed under his head. His head should be turned to one side and his tongue pulled forward, any tobacco, gum, false teeth, or the like, being removed from his mouth. Put a folded jumper or coat under the lower part of his chest if he is thin, straddle him on your knees, facing his head with your knees a little below his hips; then with fingers outstretched place your hands at the lower part of his ribs with your thumbs nearly joining; then press downward and inward; then take pressure off slowly, keeping hands in place; again with outstretched fingers as before, press downward and inward, and so on, about 16 to 20 times every minute. Keep this up for at least three hours if he does not start to breathe sooner. When he starts to breathe, keep him warm by covering with coats, jumpers, blankets, etc., or with hot-water bottles, but do not give brandy, whisky, coffee, or any other food or drink, unless he is able to talk and drink, then give one teaspoonful of aromatic spirits of ammonia in a half a glass of water or hot coffee slowly. Do not place against the skin any hot article that might burn it. Place a thick blanket or cloth over the skin and be sure that you can hold the article in your own hand without burning it. When he starts to breathe, try to make him vomit by tickling the back of his throat or by putting your finger down his throat. Never attempt to give an unconscious man anything to drink, as the liquid will choke him.

In all cases of insufficient respiration—that is, when the patient breathes regularly but very slowly—artificial respiration should not be given, but, if possible, nature should be allowed to restore the natural rate of breathing unaided.

The patient may with advantage be allowed to breathe pure oxygen, which may be supplied from a cylinder containing the gas under pressure; a reducing valve to lower the pressure, and a breathing bag with connecting tubes, face mask, and inspiratory and expiratory valves being used. The oxygen may be supplied by an oxygen generator; if this be done, no reducing valve will be necessary.

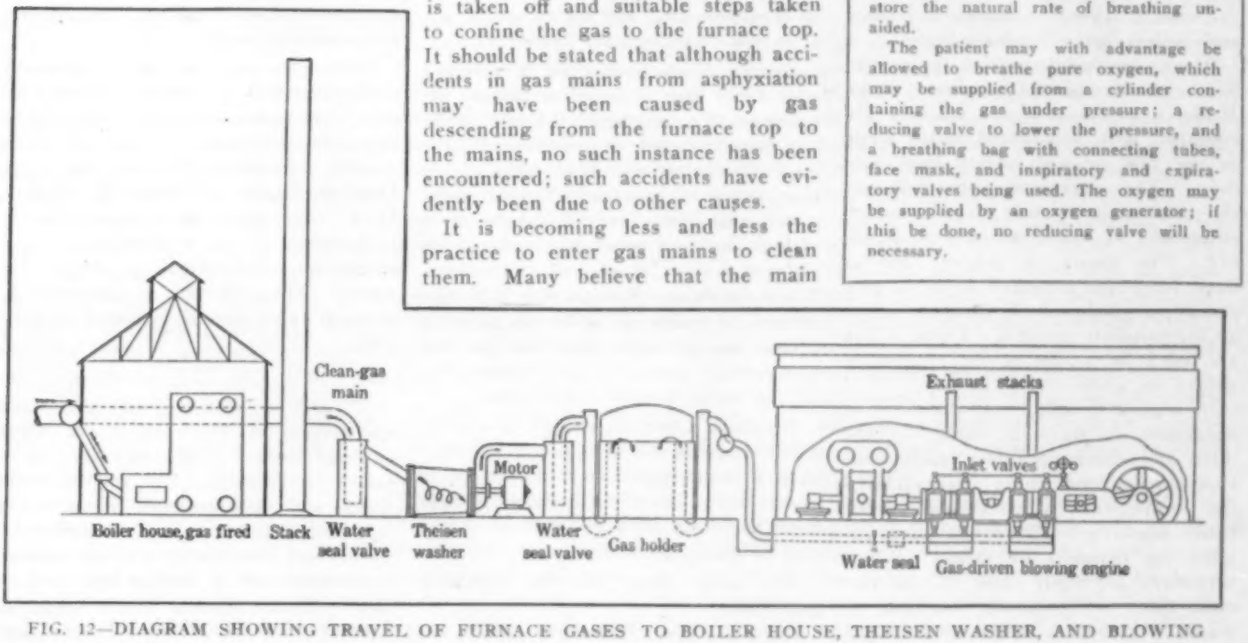


FIG. 12—DIAGRAM SHOWING TRAVEL OF FURNACE GASES TO BOILER HOUSE, THEISEN WASHER, AND BLOWING ENGINE

will fill up to a certain height, when the velocity of the gas will sweep along any additional dust and prevent further accumulation. Though this involves higher top pressure, they are unable to attribute to it any detrimental results other than occasional difficulty in changing tuyeres. Cleaning the gas has not always obviated all requirement for cleaning the mains, and in some plants, where gas from tower washers deposits considerable wet sludge, there are provided small hand-holes, or stationary nozzles, or nozzles attached to a movable ball union permanently attached to the main and extending inside it. By means of high-pressure water connections the sludge is easily washed into down legs provided for this purpose. Gas mains have been made with frequent down legs, V-shaped pockets at close intervals, as shown in Fig. 7, "zigzag" construction, and left unlined, all of which requires less attention inside. Lately many companies on their initiative are providing walks and hand railings, as shown in Fig. 8, along all gas mains and railed platforms at gas valves. This will probably be standard equipment in the near future, as there is good reason for such installation.

Danger from Gas-Cleaning Equipment

The introduction of gas-cleaning equipment brought with it new dangers from gas. The more thoroughly the gas is cleaned, the less is the chance of detecting it by sight or smell, and its use in gas engines has developed installations of cleaning equipment, the complexity of which, together with the increased need of constant supervision and more frequent repair work, is in contrast with the simple layout of mains to stoves and boilers using uncleaned gas.

It may be said that with the exception of a number of washers of the Mullen type, most tower washers are equipped with substantial railed steps to the top, or with safety cage ladders. The exceptions are few, as the furnishing of such step or ladder equipment at tower washers is standard. The stairs or ladders are at most scrubbers arranged so as to give access to platforms or manhole doors at intermediate heights. These doors are used in adjusting or examining sprays or grids.

In regard to seals and valves, it is necessary to have a valve on the inlet and discharge from each unit. Convenience and utility have dictated the employment of water-seal valves, hence working requirements have fulfilled the demands of safety. Where scrubbers are built close to the furnace, there is frequently, but not always, provided a mechanical valve, of the goggle or slide type, before the water seal on the furnace side. This is to take care of surges of gas under high pressure and do away with the possibility of the water seals breaking.

Rules to Protect Gas-Washer Operators

In some instances on account of excessive leakage or accumulative poisoning gas-washer operators have been found dead. This contingency is variously taken care of at present. One company requires two men on duty at night where only one is needed in the daytime. There is a revolving 24-hour chart at the main-entrance watchman's office, on which the operators register a record each half hour by closing a circuit from the washer house. In addition, the plant watchman or inside roundsman is required to report at the washer house every half hour and call up the watchman at the main office. There is a whistle at the gas-engine power house operated from the washer house. One blast (long or short) means "trouble; help wanted." The switch that operates the whistle is so arranged that the slightest movement will throw it in and it will remain in until pulled out. This provision was made so that if the operator is overcome by gas, the switch will remain in place until help comes.

The causes of asphyxiation from gas at engines may be summed up as follows: Lack of positive means of closing the gas line leading from the clean-gas main to the mixing or inlet valve on the engine when the engine is shut down; taking the air required for the gas-air mixture from the engine basement instead of from outside; inadequate ventilation; lack of provision for sealing off the back pressure from common exhaust pits; and the escape of gas from sewers up into the basement.

Experience has shown that it is impossible for a man to breath a gaseous atmosphere for any length of time without being affected or overcome by the gas. The safest way is to make a rule that, except in cases of extreme emergency when lives are in danger or a serious accident must be averted, one must not enter a gaseous atmosphere. When conditions demand that a certain hazard be faced in order to avoid a greater hazard, as is sometimes the case at a furnace plant, the decision must rest on the superintendent and foreman.

Breathing apparatus is used by a great many concerns, and as it is usually necessary to enter pipes or other places to rescue a man overcome, it should be kept near the place of work, even if it can not be used continually.

One large plant has the following equipment:

Gas engine power house.—Two helmets and machines complete, with spare oxygen and potash cartridges.

Gas blowers.—One helmet and machine complete, with spare oxygen tank and potash cartridges.

Theisen washer.—One helmet and machine complete, with spare oxygen tanks and potash cartridges.

Emergency hospital.—One portable resuscitating apparatus, with spare oxygen tanks; one breathing mask with one large and three small oxygen tanks.

Laboratory.—One large tank of oxygen.

Total.—Four helmets and apparatus, 1 resuscitating apparatus, 34 small tanks of oxygen, 2 large tanks of oxygen.

There are certain places to which access should be denied. The gas-cleaning house should be one. As regards gas-engine rooms and boiler houses, men should be prohibited from entering them if the equipment is leaky, but if it is not, such a prohibition is not necessary as far as considerations of asphyxiation are concerned.

Treatment for Gas Poisoning

Former treatment of asphyxia included such remedies as burying the unconscious or badly gassed man in sand, to "draw the gas out," giving the victim drafts of strong vinegar, putting blistering mustard plasters on the chest and back, cold affusions, slight electric shock, or slapping to "keep him awake." Those who recovered from severe cases of asphyxia did not, it is safe to say, do so by virtue of these measures.

Measures that have been recommended and tried with various success by physicians include subcutaceous injection of camphor or strychnine, also alkaline salt infusions. These treatments are in the province of medical men and no data has been obtained as to their efficiency, nor can any recommendations be made as to the advisability of their use. They should, obviously, be attempted only by plant physicians or surgeons. Many physicians prescribe certain drugs to mitigate the headache resulting from moderate inhalation of gas.

Treatment that has been repeatedly demonstrated to be efficient in resuscitation from carbon-monoxide poisoning is described in *Miners' Circular* 23, which may be obtained free by applying to the Director, Bureau of Mines, Washington, D. C. The information is of value in resuscitation of men severely gassed, and should be supplemented by the circular named. The procedure in administering artificial respiration is indicated on page 1081.

A cargo of iron ore has just been discharged at the Mobile & Ohio railroad docks at Mobile, Ala., by a Greek steamship. The ore is from Cuba and is consigned to a north Alabama furnace. This shipment of Cuban ore into Alabama is an unusual occurrence, all of Cuban ore used in this country having been used by furnaces near the North Atlantic coast.

British Improve Electric Furnaces

The New Greaves-Etchells Furnace Has a Solid Hearth and Involves a Unique Application of Three-Phase Current—Absence of Disturbances and Uniform Heating Are Advantages Claimed

IMPROVEMENTS in the design, construction and operation of electric furnaces used in this country have been so varied and of such importance to the industries that little attention has been paid to the progress which is being made abroad in similar lines of endeavor. That efforts are being made in England to improve the efficiency and to simplify the operation of electric furnaces is indicated by a recent article published in *The Iron and Coal Trades Review*, London, Eng. The resume of this description of an English furnace which follows will undoubtedly be of interest to readers of *The Iron Trade Review*:

The Greaves-Etchells electric furnace is of essentially British design and construction throughout, the inventors being H. A. Greaves, of the Sheffield Corporation Electricity Works, and H. Etchells, both of whom have had considerable experience with various types of electric furnaces. The interesting features of the design include a novel application of three-phase current, two phases being introduced through top vertical electrodes, the whole of the hearth being connected to the third phase and acting as a third electrode; the hearth, which is of ordinary basic material, is not penetrated by any water-cooled studs and is simply a solid lining. The arrangement of the electrodes creates such electro-magnetic effects that the whole of the bath of molten metal is continually in circulation. Three-phase current is supplied to three single-phase transformers connected with meshed primaries. The secondary windings are connected to an unequal star, one connection to the bottom and two to the top electrodes, the proportions of inequality being so calculated as to give a balance on the primary supply phases when the upper electrodes are in equal adjustment. It will thus be seen that if one arc is broken the other arcs are not affected, and any current overload passing through either arc must traverse two transformers in series and in different phase.

This effect is said to considerably reduce disturbances and to assist in maintaining a steady load. The operating advantage claimed is a very uniformly heated steel, the intense heats of the arcs being constantly absorbed by a moving stream of metal. By a slight displacement of the primary phases the currents passing through the furnace bottom and through the top electrodes can be adjusted over a wide range by means of tappings on the primary windings of the transformers. This arrangement for proportioning the distribution of heat to the top and bottom of the charge enables the slag to be superheated over the steel, as in the heroult furnace; or, alternatively, a uniform temperature between slag and steel may be maintained.

Description of Furnace

The furnace installed at the Rotherham works is designed for melting three tons of metal. It is placed at the side of the building and is conveniently located near the transformer house. The furnace itself occupies a floor space of 9 feet square. The casting pit, which is arranged for casting two groups each of four ingots, together with the ladle pit, is 7 x 24 feet. The body of the furnace is substantially constructed of heavy boiler plate sufficiently braced to eliminate danger of distortion from expansion thrust. The bottom of the furnace is dished and the bath is basin-shaped, the lining being 20 inches thick. The design of the roof is such as to allow very free expansion to the silica brick arch. The furnace is provided with a door and teeming spout on the casting-pit end, with a small charging door and slag spout on the opposite end. A large charging door, which is sealed after charging, is located on the side of the furnace. The doors, which are easily swung open by a cranked lever, and when closed are held firmly by a steel wedge, are a plug type, and are so made that the plug of refractory material enters totally sealing up the door opening.

New Arrangement for Tilting

It is reported that the makers, Watson & Co., have now adopted a new arrangement for tilting of Greaves-Etchells furnaces. This consists of a system of compensating rollers, allowing the furnace to be tilted backward or forward, the arrangement being such that the teeming spout always falls in a straight line. The tilting gear consists of a steel screwed shaft operated by a steel bevel wheel mounted upon trunnions with a threaded steel nut in the center, the bevel wheel being driven through a train of gears by a 3½-horsepower motor.

The electrodes which are of amorphous carbon, 14 inches in diameter, are mounted on the side of the furnace opposite to the large charging door. The electrode carriers are made of two masts mounted on brackets secured to the side of the furnace. They are provided with screwed spindles, upon which the electrode carriages travel. The carriages are fitted with the usual electrode holders and contact belts. Two totally enclosed motors, each 3½-horsepower, mounted on the furnace baseplate, drive the carriage spindles through worm-reduction gearing. These motors are controlled from the attendant's platform through tramway-type controllers. A similar controller for the tilting motor is also located on this platform. On panels above the controllers are mounted ammeters which indicate the amount of current passing through each of the electrodes. The motors are connected by clutches to the carriage gearing, so that either motor may be thrown out of gear and the electrodes regulated by hand in case of accident. It will be noted that the tilting and electrode motors are interchangeable. The transformers are of 800 kilovolt-ampere capacity. The connections to the top and bottom electrodes are heavy copper cables, connected in sections so that they may be easily replaced.

A charge of two tons of steel turnings may be melted under ordinary conditions in two hours and 20 minutes. The refining process for the production of a special nickel-chrome vanadium steel requires an additional two hours. Recent electrical tests of this furnace gave current and kilowatt balance on each of the three supply phases, and a power factor of 0.90 per cent.

The Greaves-Etchells furnace is made in three standard sizes: ½, 1½ and 3 and 6 tons. The ½-ton size has been specially designed to produce small ingots of high tool and other alloy steels such as magnet steel

and rustless or stainless steel. This size furnace is entirely operated by hand-gearing. It is equipped for 260 kilovolt-amperes; the 1½-ton furnace with 520 kilovolt-amperes; the 3-ton with 800 kilovolt-amperes; and the 6-ton furnace with 1,560 kilovolt-amperes. While each of the others has only two upper electrodes, the 6-ton furnace is fitted with four. In the smaller sizes the furnaces are rectangular in shape and tilt endwise. The 6-ton furnace is circular; the four electrodes are arranged uniformly. A charging door 3 feet wide is built into each side of the furnace. In this size furnace the electrode arms are constructed to swing outward, allowing the roof to be lifted clear for charging and also permitting the electrodes to be changed easily.

Walter Spencer & Co., Sheffield, Eng., have recently made some extensions to their Warren street plant which include a new steel shop equipped with a 3-ton Greaves-Etchells electric furnace. The new shop, the output from which is intended to relieve the shortage of Swedish bessemer and to supply special alloy steel, was built especially for the electric furnace. The building is 100 feet long and 40 feet wide. The floor is served by a 10-ton Vaughan electric crane, the runway for which is 22-feet above the floor, thus allowing ample head room for handling the furnace electrodes. The furnace, which is placed in one corner of the shop, is substantially the same as those described in preceding paragraphs. The bath is basin-shaped in the center; its total depth is 14 inches and when filled to a depth of 9 inches it will hold approximately 6,500 pounds of steel. The furnace is tilted by a 3-horsepower motor. The electrodes employed are 14 inches in diameter, and are fitted with water-cooled bushings where they pass through the furnace roof. The transformer is in an entirely independent 12 x 34-foot building. High-tension power is received at 11,200 volts and transformed through three transformers having a total capacity of 650 kilovolt-amperes to 80 volts for melting and 65 volts for refining. The oil-immersed controlling switch is operated from outside, as also are the voltage regulators. The controllers for the electrodes and tilting motor are of the tramway type and are fitted with the customary meters.

The ladle pit is 8 x 8 feet; the casting pit is 10 x 20 feet, providing for three nests of ingot molds. The time taken for a full melt is approximately three hours at a consumption of 600 kilowatt-hours per ton. The furnace is no doubt much above the capacity which would be likely to be installed for the manufacture of high-speed tool steel.

In this connection, however, it is interesting to note that, with a view of demonstrating its possibilities, an experimental melt was made with 5,000 pounds of high-speed steel scrap. The refined metal was poured in somewhat less than four hours from the time of charging, the furnace being charged while hot from a previous melt.

New Dock Will Facilitate Ore Loading

WHILE the great ore-carrying fleet of large and small steel and wooden freighters and ungainly whalebacks have been anxiously awaiting the opening of the 1917 navigation season during their period of winter inactivity, in anticipation of breaking 1916 records, several large construction projects designed to facilitate the transfer of ore from the cars to the boats have been completed. One of the largest and most modern of the new ore docks which have been erected is the one recently completed at Two Harbors, Minn., by the Duluth & Iron Range railroad. This new dock is designed for a total pocket capacity of 11,856,000 cubic feet which gives a total capacity for about 80,000 tons of ore. The deck is built entirely of steel and concrete and is 1,368 feet long and has an approach of 768 feet. The approach accommodates two tracks which are carried for 318 feet on a steel trestle of viaduct construction. The remaining portion of the approach is constructed of timber. The timber approach is up a 0.4 per cent grade; the steel portion and the dock have a level track grade.

The dock rises a distance of 80 feet from water level to the base of the rails. The bin fronts are 56 feet wide and have overhanging platforms on each side which extend 9 feet further. The 228 pockets are arranged in pairs on either side of the dock. These bins have an individual capacity of 5,200 cubic feet. The structural steel frame of the dock consists of steel bents located in planes which constitute the partitions between the bins. Vertical columns are supported on the bin girders, serving as a framework for the partitions between the bins and as supports for the track floor above. All the bins, partitions, floors, etc., are built of concrete. The track deck is arranged with reinforced concrete slabs between the tracks, the space between the rails being left open to allow for the dumping of the ore. Cross walks connect the longitudinal walks at convenient intervals and occasional stairways provide access to the continuous platforms at the level of the outlet doors.

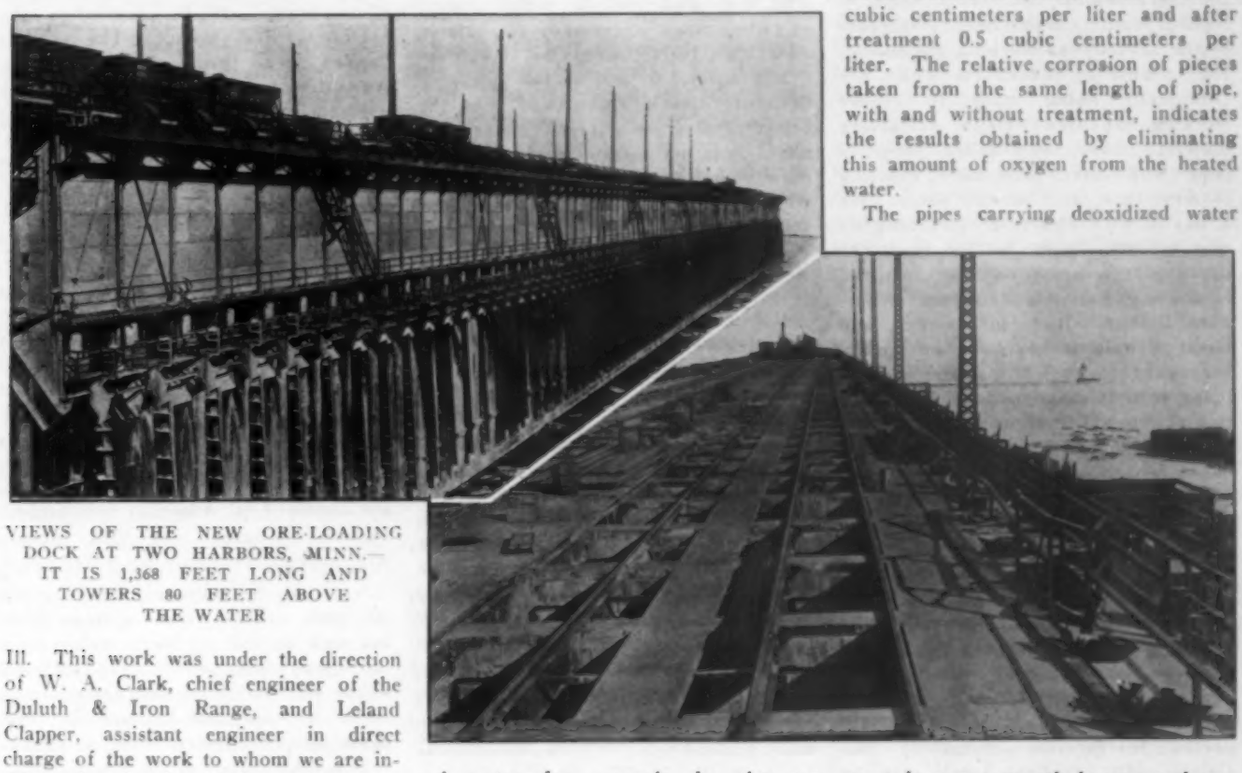
Old Dock Moved

The new dock, according to an article which appeared in a recent issue of *The Railway Age Gazette* of which this is an abstract, replaces an old wooden dock which was located 15 feet to one side of the new structure. As the location of the old dock had to serve as a slip for the new one, it was necessary to remove it before the new one could be placed in operation. The old structure which has been used for about 17 years was 1,850 feet long, 52 feet wide and 57 feet high. The removal of the old structure which contained about 5,500,000 board feet of lumber was accomplished with a stiff-leg derrick set on a 30-foot truck traveling on the track deck and by floating derricks. This work was started in December, 1915, and was completed in February, 1916, when actual construction on the new dock was started.

The operating arrangement of the new dock is somewhat different from those already in use at Two Harbors. With easily running ore one man can load a boat alone without difficulty. The doors for the dock are 7 feet wide and are placed off center so that one edge of the door lines up with one partition, thus giving a straight discharge for one side of the pocket. A hopper corner shaped like a plow share is provided to deflect the ore from the other partition to the door. This style of partition was adopted after a series of tests which indicated that it does away with much of the arching that takes place with the center-door pockets. It is also said that considerable time is saved by this method. The doors weigh about 800 pounds each and are operated by hand hoists on the deck of the dock. They are counter-weighed so that only friction must be overcome and they can be closed against the flow of ore. The time of opening and closing against ore is about 10 seconds. The spouts used are 7 feet 4 inches wide at the dock end and are 4 feet 6 inches wide at the boat end. The sides are 2 feet 6 inches deep; the spout weighs 8,500 pounds. They are 35 feet long and are arranged to swing from an operative position, 45 to 70 degrees below the horizontal, to an idle position 70 degrees above the horizontal. The spouts are raised and lowered by ⅜ x 5-inch flat wire ropes con-

nected to individual hoists for each spout. These hoists are arranged in groups of 12 to be operated by a single motor but not more than two may be raised at one time.

The Barnett & Record Co., Minneapolis, had the contract for the foundations complete. The American Bridge Co. had the general contract for the fabrication and erection of the structural steel work. The superstructure concrete which was built in place was done by the Newton Engineering Co., Milwaukee, while the unit concrete was done by Strom Bros., Two Harbors, Minn. The hoisting and operating machinery was furnished and installed by the Whiting Foundry & Equipment Co., Harvey, Ill. This work was under the direction of W. A. Clark, chief engineer of the Duluth & Iron Range, and Leland Clapper, assistant engineer in direct charge of the work to whom we are indebted for the above information.



VIEWS OF THE NEW ORE-LOADING DOCK AT TWO HARBORS, MINN.—IT IS 1,368 FEET LONG AND TOWERS 80 FEET ABOVE THE WATER

Prices of Castings More Than Doubled

New York, May 15.—Prices on gray iron castings reflect the advances in the cost of labor and materials of the past two years. Current quotations are about 3 cents a pound higher than they were when the war broke out in 1914. Gray iron foundries in this district now are quoting around 4.50c to 5c per pound, at the foundry, for average machinery castings; around 5c to 5.50c for ordinary marine castings and around 6.50c to 7.50c per pound for cored castings. Further advances are likely and, in fact, one large interest expects to advance probably 1c above this level within the next 10 days.

Elimination of Corrosion in Water Pipes

In a paper before the American Society of Heating and Ventilating Engineers, January, 1917, F. N. Speller discussed a method for the practical elimination of corrosion in hot-water supply pipe. Free oxygen and carbonic acid in water have been proved to be the cause of practically all the trouble with hot water supply lines, as these gases are retained in the water with the closed systems of heating used almost universally in this country. There are two methods of removing these gases from water: By reducing the pressure of the heated water—for example, by the use of an efficient open type heater under atmospheric pressure, or partial vacuum; and by keeping the hot water in contact with a large surface of iron under pressure for a sufficient length of time to remove and fix the oxygen and carbon dioxide.

The latter principle has been in use at two plants during the past year. Both installations have demonstrated that the corrosion of iron or steel pipe can be arrested and practically eliminated by this process. A new hot-water heating system installed at one plant consisted of a storage tank filled with alternate pieces of corrugated and plain steel sheets, No. 26 gage, arranged radially around a filter. The water was heated by a heater having a capacity of three gallons per minute and passed downward between these plates, being thereby deoxidized to a large extent. The water then flowed upwards through pipes to the top of the filter and downwards again through the filter and finally up through the central pipe to the system. The return with check was brought into the bottom of the chamber underneath the filter bed.

It is, of course, necessary to filter the fine rust out of the water so treated before use, and it is also necessary that the filter be so designed in connection with the heater as to be kept hot when no water is being drawn.

The average oxygen contents of the water before treatment was about 8 cubic centimeters per liter and after treatment 0.5 cubic centimeters per liter. The relative corrosion of pieces taken from the same length of pipe, with and without treatment, indicates the results obtained by eliminating this amount of oxygen from the heated water.

The pipes carrying deoxidized water were in use a month longer and carried 50 per cent more water but show from 62 to 85 per cent less corrosion, based on the deepest pitting in the pipe carrying untreated water. The best results were found with the steel pipe which had the least amount of mill scale on the inside surface.

The life of the plates is a function of the quantity of water treated. Assuming the raw water contains 9 cubic centimeters of free oxygen per liter and is completely deoxidized, from the analysis of the rust formed, about 220 pounds of iron will be used up in treating 1,000,000 gallons of water. At this rate and figuring the cost of sheet iron scrap at 2c per pound, the cost of material for deoxidization of water is well within the usual cost of chemicals for the treatment of boiler water.

The Deterioration of Refractories

Rapid Advances in Metallurgical Operations Have Called for Parallel Progress in Making Firebrick for Open Hearth and Similar Furnaces—It is Essential that the Refractory be Chosen Judiciously

BY H. B. CRONSHAW

DURING the last 10 years, and especially during the second half of this period, users of the best procurable firebricks have frequently directed attention to the inefficiency of the material supplied to them. This is evidently an outcome of the rapid advances made in the metallurgical operations, both as regards output, which means increase in the severity of working conditions, and because of the efforts which are continually being made to reduce working expenses. Hence refractory materials have been called upon to cope with more and more exacting requirements, and at the same time it has become clearer to metallurgists that efforts ought to be made to decrease the great expense incurred in the installation and upkeep of furnace linings. Both in America and Great Britain it has been customary to regard the brick manufacturer as being entirely responsible for this state of affairs. Very probably this is actually true in a great number of cases where the brick manufacturer has failed to keep pace with metallurgical advances and properly to understand the requirements of the consumer. On the other hand, the latter has not, in many cases, been in a position definitely to state these requirements. If the brick manufacturer be not acquainted with the conditions under which his products are to be used, he can hardly be expected to furnish satisfactory materials. An excellent brick may be condemned if it happens to be used in the wrong place. The fault is therefore not entirely that of the brick manufacturer, but is shared to some extent by the consumer. Furthermore, there is undoubtedly a lack of proper understanding between the two parties.

The first step toward supplying any particular furnace with a lining is to ascertain the chief destructive agents at work in every part of it. If these are known, the consumer will understand exactly what kinds of bricks are most suitable for the various parts of his furnaces. It then rests with the brick manufacturer to produce the required material.

This paper was originally prepared by the author, H. B. Cronshaw, as a Carnegie scholarship memoir.

It is now generally recognized that such factors as infusibility and chemical composition are not to be taken as the sole indications of the degree of refractoriness of a material, using the term in its broader sense, as indicating the ability to resist all forms of destruction, and not fusion alone. The old idea that a high content of silica was necessarily associated with high refractoriness is also practically dispelled, and it has come to be more clearly recognized that the refractoriness of a given material is not a function of one property alone, but depends on a number of factors which vary in relative importance according to the working conditions which prevail in the place it is used.

Softening Point Important

In judging a particular clay as regards its suitability for firebricks, determination of the softening point is a matter of first importance. In this way Mellor has classified clays and shales, first of all, into two main groups—refractory clays which soften above 1,500 degrees Cent., and non-refractory clays softening below this temperature. Refractory clays include practically all the so-called fireclays, very few of which soften below 1,500 degrees Cent. They are further divided as follows:

Quality.	Softening point
Low-grade	1,500 and 1,650 degrees
Medium	1,650 and 1,750 degrees
High grade.....	1,750 degrees and above

The determination of softening point is made under certain fixed conditions which, for instance, take into account the rate at which the temperature rises.

Apart from the iron and steel structure which constitutes the actual framework or skeleton, open hearth furnaces are built up of various kinds of the most refractory firebricks at present obtainable. Speaking in a general way, the arrangement of the refractory materials is very similar for all these furnaces. As regards the body lining, however, one important difference does exist which is conveniently used as a means of dividing the furnaces into two classes. This is dependent on the difference in chemical conditions determined by the particular process adopted for making steel—that is, whether acid or basic.

In the case of furnaces working on the acid process, the roof, sides and blocks are constructed of silica bricks; the hearth is made up of a number of layers of fritted sand, resting on a stepped arrangement of silica bricks which constitutes the bottom of the furnace. The sand is banked up to the level of the doors. An inferior type of brick is often used for part of the blocks. Furnaces of this type, without slag pockets, usually run about 16 weeks, or 144 heats, before being stopped for serious repairs or partial rebuilding, which may consist in the erection of a new roof and sides. If, however, slag pockets are attached, which is always the case in modern furnaces, the length of life is increased to 22 weeks, or about 198 heats. In more favorable instances, however, the roof may last double this time if skilfully repaired. The bottom lasts several years before it requires rebuilding. Apparently better results are obtained in America, for, according to Stoughton, an acid furnace will survive as many as 1,000 heats.

As regards furnaces working on the basic process, quite a large number now in use are built with a roof of silica bricks, the sides partly of silica and partly of magnesia bricks, while the bottom consists of magnesia bricks covered with a considerable thickness of magnesia limestone or dolomite. Other arrangements of refractory materials in basic furnaces are to some extent still adopted. The roof, walls, and bottom may be built of silica bricks, while the hearth consists of the usual basic material. Another arrangement consists in constructing the entire bottom, and a portion of the sides, of basic material, and the rest of the sides, together with the roof, of silica bricks. Chromite is often inserted in the walls at the junction between basic and acid materials. Several methods have been used for detailed construction of the hearth. The best results are apparently obtained when the basic material is fritted on in layers in a way similar to that employed in acid furnaces. The bottom itself may consist of silica

and magnesia bricks. The latter give the best results, but are more expensive.

The arrangement of bricks in the blocks and regenerators is very much the same for both acid and basic furnaces. Various forms of blocks appear to have been tried, but the present tendency seems to be towards a reduction in size. Very often somewhat inferior bricks are used for certain parts, but it is questionable whether any advantage is gained by doing so. On the other hand, in the case of modern Talbot furnaces, the more expensive magnesia bricks are built into the gas ports. As regards the regenerators, ganister bricks appear to find general use for the checker work. The lifetime usually assigned to regenerators attached to large Talbot furnaces is about 18 months for the gas chambers, and 12 months in the case of the air chambers.

Examination of the interior of the body of a furnace after, say, 14 to 18 weeks, shows that erosion of the roof has taken place, not uniformly over the whole surface, but somewhat irregularly, so as to leave furrows, hollows, and crevices. These peculiarities can be best ascribed to the abrasive action of fine dust swept through the furnace by the producer gas. The disastrous effects due to the "cutting action" of the flame make themselves plainly evident in the rapid destruction of the ports.

Temperature Variation Effect Twofold

When a firebrick, or body of firebrick, is subjected to temperature variations, it generally undergoes a corresponding change in volume. These temperature variations have a twofold effect. In the first place, the lining suffers as a whole. The roof, walls, hearth, and other parts of the furnace expand on heating. Also in most cases, owing to a permanent expansion and contraction slowly taking place after the temperature has attained a maximum, the brickwork does not reocuppy its original volume when the furnace cools down to normal temperature again. Besides this, differential movements set in when the temperature is raised or lowered. Thus it is obvious that, unless proper precautions are taken, the lining would be very soon destroyed from these causes alone. The second result of temperature variation is the production of strains and differential movements within the bricks themselves. The tendency is thus towards the production of cracks and general disintegration.

These act conjointly; the independent efforts of either would, relatively speaking, produce slight results. Most furnaces are equipped with linings made from materials which soften at temperatures higher than those attained during working conditions, that is, providing the material is not directly exposed to the full play of the flame. There appears to be no really reliable information concerning the temperatures holding in different parts of the furnace.

Flames Should Not Impinge on Bricks

Le Chatelier estimates the temperature of gas entering the body from the regenerators as 1,200 degrees Cent., and the air as 1,000 degrees Cent. As a result of a large number of observations made on the gas passing from the regenerators into the body of a 150-ton Talbot furnace, the temperature may be regarded as varying between 1,000 and 1,200 degrees Cent. The temperature of the flame must therefore rise considerably above this, and hence the importance of preventing the flame from impinging on the brickwork. It would be interesting to make direct measurements of the temperatures attained by the inner surface of roof and walls, particularly the roof. Experienced chemists estimate it as being something like 1,500 degrees Cent. If so, this is rather dangerously near the softening point of silica bricks, which, according to Kanolt, is from 1,700 to 1,750 degrees Cent., the determination having been made on three samples. A magnesia brick, on the other hand, is recorded as softening at 2,165 degrees Cent.

It is a well-known fact that, in conjunction with temperature, fluxes play an extremely important part in the process of denudation. They vary in nature and origin. The violent spurting of the bath of slag at certain stages in the process constitutes one possible source. Another is the dust which is brought in by the producer gas. Furthermore, a considerable amount of fluxing material in a fine state of division is introduced during charging, and some of this must be hurled against the roof by the inrush of air through the open doors. The particles carried along by the producer gas must be raised to a high temperature during their passage through the regenerators, but when they are well within the body of the furnace a certain proportion very probably fuses. Some of this sticks to the roof and sides, while the rest is carried through the block into the regenerators. In any case, the internal surface of the furnace is in a fused or partly fused condition, and thus acts as a very efficient dust-catcher. The fluxing process is, therefore, rapidly promoted, and, as the fused material is swept away, fresh surfaces are exposed for attack. Evidently the rate of denudation is somewhat accelerated by the presence of cracks and by increasing the porosity of the material, although the latter consideration is not so serious a matter as might at first be supposed, on account of the inability of the slag to penetrate into the interior. In this case the importance of fluxing as a denuding process is to a large extent dependent on the constant removal of the slag and the addition of fresh supplies of fluxes to surfaces which are maintained newly exposed by this removal of waste products. An analysis of the fused portion showed an addition of lime and oxide of iron. The former is evidently derived from the charges, and the latter partly from this source and partly from the producer dust.

Attention is directed toward the importance of seeing that the bricks in every part of the lining are set close together, with the object of making the joints as narrow as possible. In certain places this is not possible, because room for expansion of the masonry must be allowed for. It is clear that the joints will form lines of greatest weakness, so that the narrower they are the better. Actual observation leads one to the opinion that far too much mortar is used. To a large extent this is due not so much to defective workmanship, as to the fact that even the best bricks show remarkable variations in size and form.

The brickwork in the port-blocks suffers under influences which are similar to those obtaining in the body of the furnace, though somewhat modified. Denudation is particularly intense at the ports, and is by no means eliminated by use of water-cooled tubes. In other parts the temperature is not so high, probably in the neighborhood of 1,100 degrees Cent.; although, on the other hand, the action of the dust must be rendered more intense on account of its being confined in less space. In any case, the surface of the bricks is fluxed, as can easily be seen by looking into the flues soon after the gas is cut off and the blocks are drawn back.

Difficulties in Regenerators

The chief troubles in the regenerators are undoubtedly due to the slagging effects of dust. The results of this are particularly serious and well marked. Undesirable effects begin to appear very soon after the checkers have been built up. Unlike the state of affairs which exists in the case of the roof bricks, the slag

which collects in the hollowed surfaces of checker bricks is allowed gradually to work its way into their interior. This, of course, is particularly the case if the bricks happen to possess a marked degree of porosity, or if they happen to develop internal cracks at all readily.

As regards the length of time which regenerators usually run before they are opened, and the checker work rebuilt, the gas chambers in a large steel works where Talbot furnaces were being used were allowed to run for 18 months, and the air chambers for 12 months, before being completely rebuilt. In another instance, where basic Siemens furnaces were in use, the gas and air chambers survived 24 and 12 months respectively, while for a particular set of acid Siemens furnaces both pairs of chambers were only allowed to run for 40 weeks. In all these examples slag pockets were provided, and ganister bricks were used in the checkers. Slag pockets appear to have a considerable effect on the life of regenerators. This can easily be understood when one considers that the slag which accumulates at the bottom of a pocket, attached to (say) a small basic Siemens furnace, very often collects at the rate of about a foot in depth per month.

The analyses given in an accompanying table throw additional light on the details involved in the process.

Analysis *D* makes it clear that the dust which collects among the checker work is very rich in ferric oxide and lime, and also contains a surprisingly large amount of magnesia. The slag (see analysis *A*) is remarkable for its relatively high content of silica. From this and other considerations it seems reasonable to infer that, for the most part, it represents drops of slag from the roof.

Analyses of Slag Accumulations

	A	*B*	*C*	*D*	*E*
	Per cent	Per cent	Per cent	Per cent	Per cent
SiO_2	59.80	86.34	83.62	12.70	30.5
Al_2O_3	5.50	7.98	10.97	60.70	15.8
Fe_2O_3	20.57				28.2
CaO	11.90	2.68	4.73	26.30	4.1
MgO	.....	Trace	Trace	2.19	0.6
Ignition loss	.....	0.16	0.16	.....	10.2
			.....	.....	K_2O 1.9
			.....	.....	Na_2O 1.2
			.....	.....	SO_3 5.8
			.....	.....	TiO_2 1.1
			99.48	101.99	99.4

A.—Partial analysis of slag taken from the slag pocket of the furnace mentioned under *B* and *C*.

B.—Partial analysis of the interior of a checker brick taken, after two years' use, from the gas chamber of a small basic Siemens furnace.

C.—Analysis of the surface portions of the same brick.

D.—Analysis of checker dust taken after 14½ weeks from the gas chamber of a large Talbot furnace.

E.—Analysis of producer fuel ash given by Dr. Mellor.

A Tribute to Pittsburgh

William Archer, Distinguished English Writer Calls it "Titanic, Lurid, Picturesque, Romantic" and Full of Historical Associations

In an exceedingly interesting essay entitled "America Through English Eyes", by William Archer, published in *The Westminster Gazette*, appears a tribute to the Pittsburgh district that cannot fail to find an echo of appreciation throughout the American iron and steel industry. The romance of Pittsburgh has long been recognized by discerning American iron masters. Its recognition by a distinguished writer in the land of our allies is a cause for gratification. Mr. Archer's tribute follows:

"To any one with a spark of imagination the United States is the most fascinating country in the world. Its past is romantic, its present marvelous, its future inconceivable.

"Let me give one instance of the romance of the past that clings to so many places in America. I will not speak of Lexington or Concord; I will not speak of Mount Vernon or Charleston; I will speak of the place in all America which most people in England, perhaps, think of as the very antithesis of romance—I mean Pittsburgh. It is called 'hell with the lid off', and I don't say it does not merit that term of endearment; but to stand on the big bluff over against the city, and look down upon the confluence of the Allegheny and Monongahela (most beautiful of words!) is to experience a strange and complex emotion. For the two rivers (each as great as the Rhine or the Rhone) unite to form the magnificent Ohio. And the Ohio rolls on into the still mightier Mississippi; and down these gigantic waterways the first French adventurers paddled thousands of leagues through the boundless, sinister wilderness; and Martin Chuzzlewit and Mark Tapley sought the city of Eden; and Huckleberry Finn and Jim went drifting through an Odyssey which I, for one, believe to be as surely immortal as any story in this world. A few miles up the Monongahela is the spot where General Braddock, with George Washington and George Warrington in his train, fell into the fatal ambush. And there, at the very tip of the tongue of land between the two rivers, nestling in the shadow of the skyscrapers like a beehive under St. Peter's, is the little octagonal blockhouse, pierced for musketry, which was once Fort Duquesne, and after that Fort Pitt, and from which the city takes its name. Of the titanic, lurid picturesqueness of the scene I shall not attempt to speak. I have merely tried to suggest a few of the historic and literary associations which cluster around the spot itself, and the vast river system to which it is, as it were, the north-eastern gateway. How any one can find America prosaic or uninteresting passes my comprehension."

Combustion Furnaces

The results of an investigation of furnace combustion have just been issued by the bureau of mines. The bulletin is entitled, "Combustion in the Fuel Bed of Hand-Fired Furnaces", by Henry Kreisinger, et al. The main object of the investigation was to determine the conditions governing the process of combustion in the fuel bed of a hand-fired furnace. The results of this report furnish data for correct design of coal-burning grates and furnaces and their efficient operation. They also cast light on the important problem of clinker trouble as related to fusibility of ash. They further indicate the possibility of a high rate of gasification of coal in gas producers.

The first part contains general information on the combustion of coal in furnaces. What combustion is and how the process of combustion takes place are explained; how much air is needed to burn one pound of coal and how the air and the coal are brought together to effect combustion are dealt with. The method of feed-

ing coal and air in four types of commercial furnaces is shown and discussed.

The second part contains the description and the results of about 50 tests made in a small experimental hand-fired furnace, which was designed for an accurate study of the processes of combustion in the fuel bed. Provision was made for taking gas samples and temperature measurements at various depths in the fuel bed. Pittsburgh coal, anthracite coal and coke were tested in this furnace. The rate of combustion was varied from 20 to 185 pounds of fuel per square foot of grate per hour. Two thicknesses of fuel bed were used—6-inch and 12-inch. The air supplied through the grate was measured with an orifice.

The third part discusses the investigations described in the second part of the report, and it includes about 40 charts that show the composition of the gases and the temperature at different depths in the fuel bed of a hand-fired furnace, as well as the various relations between air supply and the rate of combustion. Many deductions are drawn from the charts, and the significance of these deductions in the operation of industrial furnaces is shown. Many useful suggestions on the operation of such furnaces are offered.

The fourth part contains miscellaneous data on the composition of gases rising from the fuel bed of a hand-fired furnace under a steam boiler, a Murphy stoker, and a Jones underfeed stoker. It also contains a short discussion of the bearing of the results of the experiments on the operation of gas producers and explosions in boiler furnaces.

Conveying Furnace Ashes With Steam Jet

Paralleling the development of power plants for steel mills has been a corresponding advance in the methods employed for handling ashes from furnaces, ovens, etc. One of the most recent methods of conveying ashes from the ash doors is that developed by the George J. Hagan Co., Pittsburgh, Pa. By means of this system the ashes are carried through specially constructed pipes by means of a steam jet. The system of piping can be applied to any type of power plant installation, and the ashes can be conveyed direct to railroad cars, wagons or storage bins. The accompanying illustration shows a typical layout for a large boiler room with the ashes being discharged to an ash tank for subsequent loading into railroad cars.

NEW ENGINEERS' CLUB, DAYTON, OHIO

The conveyor pipe used for carrying the ashes from the furnace is made of a special cast iron mixture designed to resist the abrasive action of the ashes while passing through the pipe at high velocity. The elbows and special fittings which connect the sections of pipe are provided with wearing parts that are easily replaced. The design of the ejection elbows and nozzles is said to provide for a minimum consumption of steam.

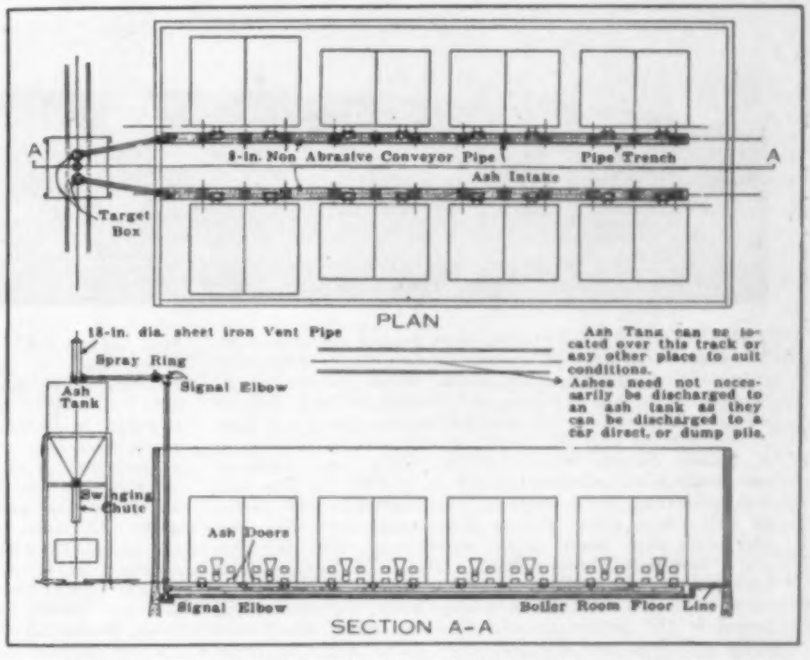
Dayton Engineers Will Build New Club

A contract has been let for the construction of a new building for the Engineers' Club, Dayton, O. The new structure, which will be one of the most complete of its kind in the country, probably will be ready for occupation Jan. 1, 1918. The total cost of the new home will be $170,000, of which $130,000 is for the building alone. It will be a 2-story and basement structure. The exterior will be in a refined Georgian design, using buff gray brick with carved stone trimmings.

The public and private dining rooms will be on the first floor, together with the reception rooms, ladies' waiting room, kitchen, etc. French windows will open from the dining room into a garden.

The lounging room will be on the second floor, together with the library and an auditorium with a seating capacity of 450. Sleeping rooms also will be provided for out-of-town guests and members.

The interior of the building, except the ladies' waiting room, will be finished in English paneled design. The ladies' portion of the new home


A
A
8-in. Non Abrasive Conveyor Pipe
Pipe Trench
Ash Intake
Target Box
PLAN
18-in. dia. sheet iron Vent Pipe
Spray Ring
Signal Elbow
Ash Tank
Ash Tank can be located over this track or any other place to suit conditions.
Ashes need not necessarily be discharged to an ash tank as they can be discharged to a car direct, or dump pile.
Swinging Chute
Ash Doors
Signal Elbow
Boiler Room Floor Line
SECTION A-A

TYPICAL LAYOUT FOR A LARGE BOILER ROOM—THE ASHES ARE CONVEYED TO AN ASH TANK FOR LOADING INTO RAILROAD CARS

will be in a dainty Adam style.

The auditorium will be completely equipped with stereopticon, motion picture and kinemacolor machines, together with electrical devices for staging various sorts of scientific demonstrations. The building is being erected under the direction of Schenck & Williams, architects. The Davis & Hunt Co., Dayton, is the general contractor.

Use of Rope Drives in Cotton Mills

In a paper recently delivered before the Engineers' Society of Western Pennsylvania by J. M. Alison engineer, William Kenyon & Sons, Dunkinfield, Eng., the author pointed out the differences between cotton and manila rope. Mr. Alison stated that cotton rope in England was fast replacing other materials where rope drives were desired. The author stated that in steel mills it was common to find cases where cotton rope had driven hot roll mills for 10 or more years and cold roll mills for as long as 15 years. Mr. Alison said in part:

"It is difficult to comprehend why cotton ropes have not been more freely adopted in the United States when England is daily exporting large consignments to all parts of the world. In Canada, many cases could be cited of firms who after experimenting in replacing manila by cotton ropes have continued to employ the latter, irrespective of the higher initial cost. The tensile strain of a driving rope does not always enter into the problem, else manila would undoubtedly hold the field, but its fibres are of so harsh and wiry a nature, that they do not take kindly to the successive twisting and bending operations. The life of cotton ropes depends upon their size and the conditions under which they have to work. Durability may be gaged by sectional area, and the most economical diameters range from 1½ inches to 1¾ inches, more of the latter being used in England than any other size. For rolling mill work, however, it so often becomes a matter of sheave widths. Over-roping certainly retards efficiency. The fault sometimes manifests itself by the slack changing with the pulling aid and at other times by the ropes traveling across the grooves or even leaving the pulleys altogether. Sheave diameters have a very important bearing on the question and while in England the minimum standard is taken as 30 times the diameter of rope, in America 40 to 50 times is accepted. The rolling mill rope drives in the Pittsburgh district are on a larger scale than those found in English mills, and the drive, so far as the rope to power is concerned, is treated in a liberal fashion and with an eye to "safety first". The power factor is generally ample, but nevertheless, the rope costs per ton of output, or on any other basis, are high, and were English companies to get a comparatively short life out of ropes as American manufacturers do, it is quite possible that some other material would be substituted for rope in mill drives.

Westinghouse Gets Ship Motor Contracts

Contracts totaling approximately $2,000,000 have been placed with the Westinghouse Electric & Mfg. Co., East Pittsburgh, by the New York Ship Building Co., Camden, N. J., for furnishing electrical equipment for the propulsion of the new superdreadnoughts COLORADO and WASHINGTON.

The equipments to be furnished are practically duplicates of those contracted for by the navy department for the U. S. S. TENNESSEE, now building at the New York navy yard. The four propellers, as in the case of TENNESSEE, instead of being mechanically connected to driving engines or turbines, are to be driven by individual motors. The current for the motors will be furnished by two turbo generators.

Big Cuyuna Open Pit Being Developed Rapidly

DEVELOPMENT work has been pushed steadily on the Mahnomen open pit on the Cuyuna range. This property consists of 125 acres on the north Cuyuna range, lying north of and adjoining the Pennington and Armour mines. Exploration was started in the spring of 1914. A few months later the lease was taken over by Clement K. Quinn, Duluth, Minn., and associates, who continued the exploration and developed a large body of iron and manganiferous ore. Stripping was started in the spring of 1915, three steam shovels being employed. The first shipments were made in the summer of 1916, the season's movement being 146,602 tons. The property is operated by Mr. Quinn and associates. The development is being continued on a large scale, the present pit, which is the largest on the Cuyuna range, being over 3,000 feet long and 800 feet wide. The depth of stripping averaged 65 feet, practically all of the overburden being sand. At one time last summer, three methods of stripping were being employed in this pit at the same time. Owing to a slide of muskeg, a dragline and a hydraulic stripping unit were used in addition to the steam shovel, to assist in hurrying the stripping. At the present time, a shaft is being sunk to the 250-foot level, where drifts will be extended, cross-cutting the orebody and extending under the pit area to the limits. These drifts will drain the water from the orebody and from the pit itself. The orebody apparently extends to a considerable depth, as the drill holes were bottomed in ore at 500 feet. The mine ships four grades of ore, the principal grade being a non-bessemer iron ore. The other grades carry from 4 to 14 per cent of manganese. The illustration shows only a portion of the pit.

War Steel Demand Heavy in England

Welsh Tin Plate Trade Operating About One-Third of Pre-War Basis and Little Helped by American Bars—Ministry of Munitions Allows Advance in Middlesbrough Iron and Other Districts Petitioning

Bureau of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., April 27, 1917.

DEMAND for all kinds of iron and steel for war requirements is so large that it might suggest the conflict is just started. Inquiry is heavy. Buyers who were unsuccessful at the quarterly meeting in Birmingham last week, renewed their efforts this week, but, as a rule, without success. The constant growth of the army calls for ever-increasing supplies. Even at this late stage considerable quantities of entrenching steel is being called for; but the chief requirements are for ship building material and for this there is pressure equally in Sheffield and in the Midlands. Glasgow and Barrow have all along concentrated, mainly on ship and naval steel. They are, of course, still producing at the highest pressure. To supply this, great extensions of steel works are still in progress, especially in Sheffield. When the end of the war enables statistics of capacity increase to be published the information will be an eye-opener. In this matter alone, Germany has done herself a bad turn, in mightily increasing our competitive capacity. There has been, lately, a notable increase in the call for black sheets. These are mainly wanted for huts. For this purpose they generally first receive a coat of paint. Galvanized sheets are not finding much use in this line. Structural steel is wholly for war requirements. One of the largest structural engineers recently summarized his business as being 30 per cent for the navy, and 70 per cent for the army. It will probably be found that recent exports of steel show a considerable shrinkage over those of a year ago. Certainly, the government is keeping a tighter hand than ever upon all steel production.

In the Black country the chief trouble at present is the scarcity of fuel. Several works whose product is badly wanted have been idle for days together, owing to the impossibility of getting fuel. The pits have never made up for the Easter stoppage. The trouble has been aggravated by the longest winter within living memory, which has compelled householders to keep up winter fires.

The tin plate trade of South Wales is restricted to about one-third of the pre-war output, and, for this, it is very difficult to get bars. The same trouble affects wire and sheet production. America so far has helped very little in this matter. Shipments of steel here practically all are on old contracts. Recent quotations have not been anywhere near a business basis.

Many circumstances combine to strengthen the market for pig iron. Consumers of certain brands took full advantage of the existence of small stocks, for example, of Northampton forge iron, and, to some extent, this reacted also upon the neighboring district of Derbyshire. The transfer of a number of furnaces in both districts to the production of basic has removed that weakness, apparently, once for all. Everybody must now pay the full figure. Naturally, with all the probabilities in favor of advances, buyers are keen on forward business; but in all the districts such contracts are expressly avoided by sellers. Middlesbrough led the way a fortnight ago in getting a rise of 5s ($1.20) allowed by the ministry of munitions. The inquiry there for forward iron is exceptionally strong, both for home and allied consumers; but hardly any such business is being done. Production in that district tends to increase, yet practically all the new iron is taken up at once, and there is very little surplus in makers' hands, while the public stores are practically empty, as they have been for some time. Neutrals are trying to buy, but find it difficult to get licenses. Records of shipments have been withdrawn no doubt owing to the determination to furnish the enemy no information.

Interest, for the moment, centers upon the result of the general application by Midland smelters to the ministry of munitions for an advance. An effort has been made to get a rise of 10s ($2.40) per ton. Probably most applicants will be grateful and fairly satisfied if they get 5s ($1.20) per ton added. At the Birmingham market strong efforts were made to buy more hematite, but the efforts were generally unsuccessful. There is a desire on all hands that the price question shall be settled one way or another as makers are now insisting on the insertion of a clause providing for the application to all new contracts of any price changes subsequently made, and this arrangement is much disliked by buyers, although they cannot help themselves and have to comply.

Englishmen Stirred By America at War

It is impossible to convey to Americans any idea of the exultation with which Englishmen have received the news of the heart-and-soul entry of America into the war. We are not a demonstrative people, and many important events during the past two and a half years have been passed over almost without any sign of feeling in either direction, but this great event has stirred British emotion to its depths. We rejoice with Mr. Asquith that the whole of the great English-speaking races now are ranged on one side, with the definite object of overthrowing the despotisms which undoubtedly were the fundamental causes of the war. President Wilson has rendered a great service in setting out in bold relief the standing offense and menace which Hohenzollernism constitutes to the peace and wellbeing of mankind. The prospects of a permanent peace after the war were never so hopeful as they are now.—Correspondent of *The Iron Trade Review*.

Court Holds Trade Combine to be Illegal

Toronto, May 15.—An important decision regarding agreements in restraint of trade has been rendered by Judge Clute in an action brought by the Dominion Supply Co. against the P. L. Robertson Mfg. Co., Ltd., for failure to fill a contract for 1,500 kegs of nails. The purchaser had agreed not to resell at prices lower than those fixed by the manufacturer, who was a member of the Canadian Wire Products Association, organized in 1914, to maintain prices. On learning that the Dominion Supply Co. was cutting prices, the Robertson Co. refused to complete delivery of the goods. The judge ruled that the Canadian Wire Product Association is an illegal combine in restraint of trade, its existence being contrary to the provisions of the Criminal Code, and awarded damages of $1 per keg of nails to the plaintiff.

Will Centralize War Buying of Allies

Propose to Organize Purchasing Commission to Order Supplies for United States and Entente Governments Without Competition or Confusion—Consider Cost Plus Fixed Profit Basis—Ship Building Program Developing

WASHINGTON, May 15.—Plans of the administration for a radical readjustment as to the economic conduct of the war are being rounded into shape. As has been pointed out, heretofore, they contemplate a concentration of authority by United States government over the purchases in this country and the shipment of war supplies to Europe for all the allied nations. It is proposed that this authority shall be vested in one commission to be made up of able business men who will administer food, munitions and transportation control. While these men will be executive officers, they will not, according to present plans under consideration by the President and his cabinet, have places in the latter body. The administration has not determined whether or not legislation will be required to create these new departments.

The idea relating to the creation of this purchasing commission grew out of recent conferences between officials of this government and members of the British and French commissions. It was agreed by these government representatives that it would be to the interest of all concerned to eliminate competition among themselves for American products, and to obtain maximum efficiency from money expended. The work of drafting the agreement has been assigned to Secretary of the Treasury William G. McAdoo.

The proposed commission, which, obviously, would be the most vast purchasing agency the world has ever seen, would dominate completely the markets of the country, and would wipe out the system of competitive bidding. It will consist probably of five men but purchases perhaps would be made through one man. The purchases would go through the war and navy departments.

The question as to profits is now receiving serious consideration at the hands of officials of the war and navy departments and the munitions board of the council of national defense. It is known that serious study is being given to a proposal to award contracts upon a basis of cost of production plus specified percentages of profits. While this system might be untenable where it would call for complicated methods as to inspection, bookkeeping, etc., in the case of many items that are to be purchased, it is believed it can be applied successfully to many kinds of ordnance, steel ships and other products of a more or less standardized character. The plan to make awards on a basis of cost plus a percentage of profits would provide profits of about 10 per cent as a general thing it is thought.

The proposal became known through a request made by the surgeon general of the army for the opinion of the judge advocate general as to whether or not there was any legal objection to the letting of contracts for medical supplies under this plan. The judge advocate replied that there was no objection. Since the existence of an emergency relieved the government departments of the necessity of advertising for bids on every proposal, he said, there could be no objection to taking this additional forward step in expediting delivery. It was then divulged that similar questions had been propounded in connection with the purchase of ordnance and ordnance supplies.

A desirable result from this system, it has been pointed out, will be that the government will furnish, indirectly but with the same effect, the funds upon which small contractors can operate. It is proposed in several cases under discussion that the government pay at the end of each month for the deliveries made in that period, the munitions board determining anew in each instance the actual cost of the product to the manufacturer. This plan may avert the necessity of fixation of prices by the government — although it amounts to practically the same thing. It is understood that the percentage of profits would vary in different cases, depending upon the character and quantity of work, as well as on the capacity and condition of the private plants producing it.

The doing away with the requirement that contracts for the government shall be made only after advertising was announced in a general order issued last week by Secretary of War Newton D. Baker. The authority to eliminate the system of first advertising and instead to place contracts direct is granted by law which says the system may be discarded when an emergency exists. Similar authority has not as yet been assumed by the navy department. The war department is known to have already placed large contracts under this authority. It also is claimed that that department has sought to place orders for ordnance upon a basis of cost of production plus a certain profit. The negotiations still are pending. Another interesting discussion between the department and ordnance manufacturers relates to the matter of financing the cost of building and equipping additions to private plants. The understanding is that the war department wants the manufacturers to stand half of the entire expense while the manufacturers feel that the department itself should pay the full cost and take over the equipment after the emergency requiring its use has passed.

Drastic Control of Plants Not Expected

WASHINGTON, May 15. — Definite action will be taken soon by the senate committee on appropriations to frame legislation providing funds for the fleet of wooden and steel ships to be built under the direction of the United States shipping board. Senator Martin, chairman of that committee, said he did not know what the precise character of the legislation will be, although it is expected to incorporate it in the urgent deficiency appropriation bill. Request to do this, it is understood, was made to the Republican and Democratic members of the committee at a conference last week with President Wilson at the White House. Tentative plans, it is said, call for an immediate appropriation of $500,000,000 with authorizations running up to approximately $1,000,000,000. The money probably would be raised by a bond issue. The administration is desirous of having the legislation enacted as quickly as possible so that actual construction of the ships can be taken up without interfence of any kind.

While no positive figures can be given, according to Theodore Brent, member of the shipping board, as to the number of steel ships that are to

be built, it was inferred that the supply will be limited only by the capacity of ship yards and steel plants. Estimates have been made that the ships, to be standardized, will total 500 of from 3,500 to 5,000 tons each, according to the capacities of the ship yards. That total of vessels probably would involve about 1,000,000 tons of steel.

The board, contrary to published reports, does not propose to plunge headlong into a scheme of taking over the output of "every steel plant and ship yard in the country", or of cancelling private contracts. It is the purpose of the board, said Mr. Brent, to have congress give it authority to control the output of such plants, but merely to empower it to divert their work to the government, if such action is found necessary. The board does not anticipate that such authority will have to be exercised.

Chairman William Denman, of the board, speaking shortly after the original statements had been published, said:

"We do not think it will become necessary to take over any ship building plant or any other plant, but it is essential that the government have the power. It may be required that steel products be diverted from other industries for ship building purposes, but that probably will be done voluntarily when the request is made." Mr. Brent, speaking of the possibility of asking that private plants divert work to the government, said such action may be necessary in the case of steel castings, of which, he added, there appears to be a shortage of supply.

"I cannot say," Mr. Brent continued, "as to the size of the steel ships. Perhaps they will vary, according to the ability of ship builders to construct them. Probably it will be most desirable to build steel ships of 5,000 tons. But then it may be necessary to build some of 3,500 tons. The plans are being worked out as rapidly as possible." Mr. Brent said it is hoped to have actual production of the steel ships to begin within six months. One large company, he asserted, had informed him that, after that period, it could turn out one steel ship a day.

The program is also said to call for the taking over by the United States government of English contracts for ships in this country and to change the working operations on these vessels from the one-shift to the three-shift basis in order to hasten construction. While Japan can aid in ship construction, it was stated that the principal reliance falls on the United States because of its ship yard and steel capacity.

It is believed that the government will try to fix standard prices both for the steel ships and for the plain steel material entering into them.

U. S. Must Use British Ammunition

WASHINGTON, May 15.—Finding itself without anything like a sufficient number of gages, dies, jigs and other special tools necessary for mass production of Springfield rifles and other standard military equipment, the United States government will be obliged to resort to European standards in equipping armies it will send abroad. As stated heretofore by *The Iron Trade Review*, the war department had determined to equip the American armies with British Lee-Enfield rifles, rechambered to take Springfield ammunition. Now, however, it is understood that the department intends not only to use the British rifle, but its ammunition as well. It has been contended that this will mean interchangeability of ammunition between the American and British troops on the firing line. While, it has been pointed out, this is most desirable, yet the rechambered British rifle carrying Springfield ammunition, would be more powerful, according to authorities, than it is with its regular chamber and ammunition.

Representative Tilson, a member of the committee on military affairs recited the significance of the lack of gages, dies, jigs, etc., to the house last week. He had in the well of the house rifles, machine guns, pistols, gages, bombs, etc., such as are being use by the various nations at war and explained the art of manufacturing them in large quantities. Representative Tilson said estimates have been made that private plants in the United States have a capacity of 15,000 Enfield rifles daily.

Speaking of the inability of the government to manufacture Springfield rifles rapidly enough to serve its purpose because of the difficulty of procuring gages and other special tools in time, Representative Tilson was asked by Representative Robbins of Pennsylvania if he thought that was "good information to make public."

"Oh, everybody knows it except ourselves," replied Representative Tilson, amid laughter. "All our enemies know it. We need not try to keep it a secret now. We had better meet the situation squarely. We can not increase our capacity because we have not the special tools and fixtures. It takes special tools and fixtures which must be made by skilled mechanics. They are made from designs and it takes a lot of time to make them. We do not count the money now. We would be willing to pay any amount of money if we had these tools, but we have not got them and we can not make them in time to serve our present purpose. If we put all the available toolmakers in the country to work we can not make them in time to save us in this war, so we must discard that plan. We had a conference of the gage manufacturers of the country assembled here a short time ago. They met over in the house office building and they were asked point blank, 'How many men can you put to making gages?' On man said so many hours a week, and another man so many hours a week, and so on around the room until we got a census of all the gage makers that would be available for government work. As was told you awhile ago, it takes more gages for the rifles than for anything else. It takes a large number—120 for one piece alone, and about 1,400 different ones for the whole rifle. So that it would take us at least a year—we had just as well face that fact—under the most favorable circumstances, if we should turn all the available toolmakers that we have in the country to making gages for the large scale mass production of that one weapon. We need these toolmakers for something else. We must have artillery ammunition, and we must have gages for that. It takes 253 of these gages to make the time fuse on the end of a shrapnel shell and it takes 58 gages to make the shell itself; that is, that many different ones. We have only about so many men in the country who can do that sort of thing.

"Why is it that we have not got a sufficient number of the Springfield rifles to arm the forces that we are going to have under the present law?" inquired Representative Dowell of Iowa.

"If congress had followed my advice, given freely in speeches here on the floor, beginning nearly two years ago, probably we should have had a great many more than we now have on hand," said Representative Tilson. "The truth is, there was a general feeling that the needs of the country did not call for it, and we did not do it; but we are in the situation now that I have stated to the gentleman." Mr. Tilson said the government could not manufacture over 500,000 Springfield rifles a year if it ran its two arsenals which make them night and day, three shifts. Representative Shallenberger, a member of the committee on military affairs, said that official figures from the

war department show that the entire number of Springfield rifles manufactured since the war started is less than 66,000, although the two arsenals, at Rock Island, Ill., and Watertown, Mass., had a capacity for making 2,000,000 during that period. Moreover, Mr. Shallenberger said Maj. Pierce, speaking for the war department, had advised the committee that the exact number of Springfield rifles on hand is only 690,000. Mr. Tilson said that, while the government has 350,000 Krags on hand, he considers them out of the question for use.

Announce Steel Board of Defense Council

Washington, May 15.—Judge Elbert H. Gary, chairman of the United States Steel Corporation, has been selected as the head of a committee on steel named by the council of national defense which is to assist, with a large number of other committees named, in the further co-ordination of industries in support of the government's prosecution of the war. The other members of the committee on steel are President James A. Farrell, Steel Corporation; Chairman Charles M. Schwab, Bethlehem Steel Corporation; President E. A. S. Clarke, Lackawanna Steel Co.; Alva C. Dinkey, Midvale Steel & Ordnance Co.; President James A. Burden, Burden Iron Co; Vice President Willis L. King, of the Jones & Laughlin Steel Co., and Chairman John A. Topping, of the Republic Iron & Steel Co.

Chairmen of other metal committees are: Aluminum, President Arthur V. Davis, Aluminum Co. of America; brass, President Charles F. Brooker, American Brass Co.; coal tar by-products, President Wm. H. Childs, the Barrett Co.; lead, President Clinton H. Crane, St. Joseph Lead Co.; nickel, President Ambrose Monell, International Nickel Co.; zinc, president Edgar Palmer, New Jersey Zinc Co.

Prepare to Pool Ore and Coal Shipments

Washington, May 15.—Pooling of coal shipments on the lakes and of cars used in carrying coal to Lake Erie ports is to be provided for in a plan decided upon at a conference in Washington May 11 of coal operators, members of the coal production committee and the executive committee of the American Railway Association of the council of national defense, representatives of the lake steamship and dock interests and operating officials of the lake line railroads. The meeting emphasized the urgent necessity of eliminating all waste in iron ore and coal handling. It was pointed out that the long winter has reduced the season of navigation on the great lakes to such an extent that unless extraordinary steps are taken it will be impossible to move the enormous tonnage of ore and coal necessary to the national defense. The problem is to move 26,000,000 tons of coal from Pennsylvania, West Virginia, Ohio, Kentucky and Tennessee to the upper lake ports and to bring back 51,000,000 tons of iron ore. The coal tonnage must be transported by the railroads during the season of navigation, but only 36,000,000 tons of ore will have to be moved away from the lake front.

Ship conservation, it was pointed out, is the essential thing. That can be accomplished only by treating all the coal that is to be moved from Lake Erie to upper ports as the product of one operation. It must be moved forward and put into vessels without regard to legal title, and shipped according to its classification, not ownership, as soon as it reaches the docks. A committee to work out the plan of pooling consists of a number of coal operators.

Time to Fight

To Think and to Use Common Sense, Says Mr. Baackes

Broad-gaged business principals from a manufacturer's standpoint and a spirit of high patriotism characterized a ringing address which Frank Baackes, vice president and general manager of sales of the American Steel & Wire Co., recently delivered before the joint session of the National Hardware Manufacturers' Association and the Southern Hardware Jobbers' Association, at Houston, Tex., and before the American Iron, Steel and Heavy Hardware Association at New Orleans. The address made such a strong impression upon its auditors at Houston that by unanimous vote it was decided to put it in permanent form for presentation to every member of congress and to every chamber of commerce of the United States.

"We are confronted at this time with a very intense political and economical condition, and the two are so intimately connected that they cannot be treated any longer separately as to their consequences," said Mr. Baackes. "Our political condition has been somewhat clarified by our entrance into this war, but our economical condition has become more intensified than ever. This is going to make for a very acute situation, both as to the necessities of life, as well as to the commodities of life. I hope we all have honor enough to let the world know we are not alone a money-making machine, but we are also a red-blooded fighting machine. This means that this is a time to control our selfishness, and if we are all going to use common sense and distribute our production intelligently and conservatively, we can probably all have material to do business with.

"There is another thing I want to speak to you about at this time, and especially those of you who have had everything in the past your own way in the form of contracts: You took them when you liked, and you canceled them when you saw fit, and all that sort of thing, and if these conditions last any longer you will be confronted by a condition that will teach you that a contract is a contract. And, gentlemen, that is the way it should be at all times. We have permitted a great many infractions on our usual customs of doing business, but in war time when everything is tense, when everything is high, when the manufacturer has got to make preparations and take the burden the same as you have, he is not going to let you shove your load onto him, because he has no other place to shove it, and he has got to bear it and he is not going to do it for you.

"That much for the present. But we are not alone living for the present. We have to look to the future and what we must do to hold our prosperity, and that means an industrial preparedness, because industry is the life and backbone of a nation and the greatest boon to its people. That means that our government henceforth must become absolutely linked with business. This country must become one very vast business organization. That means that government and business have absolutely to work together for national development and the uplift of its people.

"Another thing that we need for the future is an amendment or an abolishment of our Sherman anti-trust law. And all of the anti-trust laws. And I insist and demand that for the reason that if co-operation, which is desired today by the government and by the people, is an absolute necessity in case of war, it must be of great benefit in time of peace. I don't want business not to be regulated. I don't want business to do as it pleases; but I want business to have liberty within the freedom of the law."

Obituaries

MONSIEUR E. E. SALADIN, head of the French buying commission in this country, who died at New York recently as the result of a paralytic stroke, was one of the leading men of the steel industry of his native country. His scientific career divided itself into two parts. Curiously, both his early days and the end of his life as an engineer and as a steelmaker, took place in the United States. He was born at Nancy, France, in 1856. He was graduated with honors in 1877 at the Ecole Polytechnique, the highest school for officers in France, and in 1880 at the Ecole des Mines de Paris, the most prominent French institution in civil engineering, which covers both instruction in mining and metallurgy. After serving as a prospecting and consulting engineer in various countries, he became managing director and manager of a French company at Junction City, Cal., doing placer mining by the hydraulic method in the Klamath river system. He devised an elaborate dam in these operations. After the death of his wife, he returned to France and became chief engineer in the steel department of Schneider & Co., Creusot. He gradually rose to the highest positions in that firm. His activities covered the making of steel by the electric furnace and other methods and he was the author of various refinements of manufacture, including a process for the heating and cooling of steel. When the war broke out he took up his position in the ranks of subaltern officers after a lapse of 37 years. He first was engaged in the arsenal de Dijon in remaking and in modernizing discarded war material which the French nation found necessary to rush to the front in the critical days of German invasion. After several months, M. Saladin was sent to the United States, first to supervise the buying of railroad material and eventually the manufacture of shell steel in accordance with French specifications. As the head of a staff of prominent French metallurgists and specialists, he directed the placing and filling of orders for many thousands of tons of steel of this character on behalf of his government. Under the pressure of his arduous labors, his health broke and his death occurred two months later.

Edward T. Fraim, president of the E. T. Fraim Lock Co., Lancaster, Pa., died in that city aged 61. He founded the business in 1879 and was the inventor of numerous types of locks.

Elmer W. Lawrence, aged 49, superintendent of the structural department of the National Tube Co., Pittsburgh, died at his home in Allentown, Pa., recently.

W. W. Hugus, former superintendent of the Davidson works of the H. C. Frick Coke Co., Connellsville, Pa., died May 9 at Atlantic City. He was 66 years old.

Lawrence W. Frank, secretary of the Duquesne Steel Foundry, Pittsburgh, died at his home in that city recently. He was born in Pittsburgh 46 years ago and had been connected with the foundry trade for many years.

John C. Simm, president and treasurer of the Machinists' Supply Co., Pittsburgh, died in his home in that city, May 8. He was born in Chicago, where he represented the Machinists' Supply Co. for several years.

Dennis Bauman, president of the Carbon Iron Co. from 1857 to 1873, died in Allentown, Pa., recently. Mr. Bauman was born in 1819 and served the state of Pennsylvania in various capacities until 1855. He was a former associate judge of the Carbon county court.

Richard R. Ellis, superintendent of the Detroit Forging Co., died May 6, at his home, 387 Hamilton avenue, Detroit, at the age of 50. He has been connected with the Detroit Forging Co. for the last 14 years, and was also a member of the Detroit Chamber of Commerce.

James J. Booth, of Booth & Flinn, Pittsburgh, contractors, died May 9 at his home in Pittsburgh, from pneumonia. He built the first blast furnace of the Jones & Laughlin Steel Co., that city. He retired from the contracting business about 19 years ago.

Charles Duncan Fraser, for 20 years secretary of the Oliver Iron Mining Co., a subsidiary of the United States Steel Corporation, died May 7, at the Presbyterian hospital, New York. Mr. Fraser was born in England in 1857. His identification with the iron and steel business began some 30 years ago, when he first entered the employ of Oliver Bros., Pittsburgh. He retired as secretary of the Oliver Iron Mining Co. several years ago. He received an honorary degree from La Fayette college and was a life member of the Sons of St. Andrew.

Albert Jenks Robinson, formerly a prominent iron manufacturer, died at his home in Brookline, Mass., recently, aged 86 years. He was a member of the firm of Leeds, Robinson & Co., which was connected with the Old Colony Iron Co., founded by his father. His ancestors were pioneers in the iron and steel industry.

Samuel C. Webb, president of the Diamond Machine Co., Monongahela, Pa., and a member of the S. C. Webb Engineering Co., Pittsburgh, died at his home in Mt. Lebanon, Pa., May 11. He was 43 years old. He developed several coal mining devices, including the Webb hoisting recorder, the Webb mine fan and the Webb check lock.

Capt. Joseph L. Dickelman, president of the Dickelman Mfg. Co., Forest, O., manufacturer of sheet metal products, died recently at his home in Forest, O. Capt. Dickelman had had a long and active career in the manufacturing field which included many years in the sheet metal products industry.

Louis R. Pomeroy, consulting engineer, who at various times served the Carnegie Steel Co., the Cambria Steel Co., the Schenectady Locomotive Co. and other concerns in special capacities, died at his home in Orange, N. J., May 7. At the time of his death he was connected with the Safety Car Heating & Lighting Co.

Thomas West, president of J. & J. Taylor, Ltd., Toronto, safe manufacturer, died suddenly, recently, aged 72. He was born in Glasgow, Scotland, and came to America in 1866. After filling important positions on American railroads, he became connected with the Taylor firm and subsequently acquired a controlling interest in the business.

Will H. Parry, of Seattle, vice chairman of the federal trade commission, died in a hospital in Washington, recently, from the effects of an operation, aged 53 years. Mr. Parry organized the staff of the trade commission and directed many of its economic investigations. At one time he was manager of the Moran Ship Building Co., of Seattle, and among his accomplishments was the building of the battleship NEBRASKA.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

War Readjustments Unsettling Finance

TRADE and industry are reflecting the readjustment from a war to a peace basis. The lack of effective organization for purchasing war materials is being felt keenly, but the appointment of various industrial leaders to serve on buying committees is expected to bring a speedy solution of this problem. In the meantime, a runaway market has appeared in lead to the highest prices on record, due to expectation of heavy government requirements and reservation of supplies by leading producers. Copper consumers, encouraged by the low price to the government, are waiting to see how the latter will fare next time, and what terms the allies will get. The eleventh hour decision of the house committee to include a 10 per cent increase in import duties brought a sudden jump in the price of tin and other imported commodities. Machinery builders have found they can no longer promise definite deliveries, because of doubt as to where the government's needs will lead them. Yet this is only the beginning. How far this stupendous readjustment may carry, it is not given to mortal mind to comprehend. Little wonder, after all, that the stock market is uneasy!

Iron and steel shares have been among the few favored securities to escape the wide wave of liquidation which has swept the investment markets recently. United States Steel, Republic, Lackawanna, Crucible, Bethlehem B, Midvale, and othere popular steel stocks recorded substantial net gains on the New York stock exchange last week in a generally declining market. Plenty of ammunition has been available for Wall Street's bears. First and foremost of market influences is the war financing. The stock market is perplexed as to the actual bearing of the government's war loans upon the investment situation and it considers the tax schedules of the house committee to be poorly drawn in some particulars. The allies offensive on the west front seems to have received a check. The unfavorable government crop report is followed by an advance in May wheat to above $3 a bushel. The submarine campaign continues to take heavy toll of shipping. Then finally is the uncertainty as to what will happen in Russia.

However, last week's decine in stocks does not carry much significance to most unbiased observers. The Russian scare most likely will dissolve as smoothly as the various other scares through which this country has worried the past three years. Business will go on as usual, grocery bills will be met and industrial dividends will be paid, despite the rigorous taxation provisions of the new war revenue bill.

As for steel stocks, they seem to be near a rock bottom basis at present. For example, United States Steel earned about $48 a share for common in 1916. It will earn close to $70 a share this year and a Wall Street statistician has figured it out that after payment of the excess profit tax, the Corporation will show $50 net for common in 1917. On this basis, United States Steel common will earn about $100 a share net in two years. Yet it can be bought for around $116 today. The same condition exists with relation to other steel stocks, in some cases to even greater degree. But Wall Street is moving very cautiously, giving more heed to possibilities.

Urge Changes in Corporation Tax Plan

WASHINGTON, May 15. — Pleas for material changes in the administration war revenue bill have been made to the senate committee on finance by important manufacturing interests. Representatives of steel producers and James A. Emery, counsel for the National Association of Manufacturers, were important witnesses before the committee when the hearings on this measure began May 11.

Speaking for stockholders of the Bethlehem Steel Corporation, Paul D. Cravath, New York, said the corporation income tax should not be applied to stock dividends. A tax of this character, he urged, would be a levy upon a limited class of capital and would be unjust. He suggested an amendment to the income tax section of the bill which would exempt from taxation all stock dividends unless the new stock distributed had been actually sold for cash by the holder. The committee was told that the Bethlehem corporation found it necessary to take $40,000,000 of British obligations since the war in payment for munition contracts. Mr. Cravath questioned the constitutionality of a tax upon a stock dividend, because it is a tax upon capital and not upon income and the constitutional amendment permits only a tax upon income. J. A. Kratz, representing the Lackawanna Steel Co., pointed out that his company should not be compelled to pay an income tax upon the earnings derived from subsidiaries which already were paying a similar tax. He asked exemptions upon this point similar to those which were contained in the excess profits tax. Because of the fact that he really was the spokesman for manufacturing interests throughout the country and therefore reflected their attitude toward the revenue situation, the statement of Mr. Emery was received with exceptional interest. In part, Mr. Emery said:

"Let me say that we are far more concerned about the principle of this tax than its detail or amount. The United States is embarking upon a foreign war which, if the experience of Europe counts for anything, involves stupendous expenditures. It is the duty of every good citizen to be prepared to contribute his property not less than his person in support of the republic. Heavy taxation is inevitable, but inequitable, uneconomic and unjust taxation is not merely less defensible and excusable

in war than in peace for its effects are likely to be more extensive and hurtful.

"We, therefore, venture to urge upon you, first of all, that no retroactive tax should be laid upon corporate or individual income for such tax is inherently unfair, uneconomic and un-American. It is a misnomer because it cannot be collected from that which has been distributed and consumed in whole or part. It must be paid from the present or the future, although normally levied upon the past. It was obviously not provided for by individuals or corporations in contemplation of the future, and it is grossly unjust to undertake to inflict a burden upon that which cannot be reached and must, therefore, be paid out of that which can.

"Secondly, what possible reason can be given for taxing with indivious discrimination a like amount of income derived from corporate and non-corporate sources Corporations may properly be called upon to pay an excise tax for the privilege of doing business in that form and this is provided for by an excise tax laid upon their capital stock. In addition to that, they are properly called upon to pay a normal tax upon their income—a like normal tax is paid by the individual. The present and the proposed law both recognize that a tax upon the corporation is a tax upon the stockholder.

"If a surtax is laid upon individual income when it reaches a fixed amount, no injustice is done to the individual or the corporation; but if a surtax is laid upon the individual income and an excess profits tax upon the corporate income, then inevitably some income will be subjected to a tax in the hands of the corporation and again when received as dividends by the stockholder. A like tax will not be paid upon an equal amount of income derived from a non-corporate source.

"Furthermore, the determination of excess profit is arbitrary and without due regard to the differing degrees of risk in different kinds of business. An earning of 8 per cent net may be an exceedingly high return upon a conservative business. It may be an exceedingly low return upon a business of exceptional peril or any pioneer enterprise, embarking its capital with high risk in a new endeavor.

"Two individuals, let us say, possess an income of $50,000 representing on the one hand income derived from corporate dividends and on the other, income from rents of land, houses or buildings. The income derived by the individual for the latter source would be exposed to but one federal tax—that upon individual income; that derived from the corporate source will pay, in the first instance, a normal corporation tax; secondly, an excise and stock tax, and thirdly, an excess profit tax, and if the subject of manufacture be munitions, a special munitions tax. The same amount of income derived from business done in corporate form will be subjected to a federal tax burden, substantially 150 per cent higher than the same amount of income derived from a non-corporate source."

Standard Screw Profits More Than Tripled

The Standard Screw Co., Chicago, shows an increase in net profit of $5,350,837 for the fiscal year ending March 31. The surplus for dividends is equivalent to $292.60 a share on the common stock. The comparative report follows:

	1917.	1916.
Net profit	$7,514,575	$2,163,738
Interest	8,100	41,966
Surp. for divs.	$7,506,475	$2,121,772
Dividends	3,896,289	546,289
Surplus	$3,610,186	$1,575,483

Financial Crop Ends

The valuation of total exports of merchandise by the United States during March was $551,278,328, and of imports, $270,484,439, or an excess of exports over imports of $280,793,889. The excess of exports over imports for March, 1916, was $197,152,249, and in March, 1915, $138,629,836. Exports for the nine months ending March, 1917, were valued at $4,634,863, and imports at $1,818,319,416, or a favorable balance of $2,816,544,102.

* * *

The Trussed Concrete Steel Co., Youngstown, announces it will increase its capital stock from $3,000,000 to $3,500,000. Proceeds of the new stock will be used for working capital. President Julius Kahn says 1916 business was 100 per cent greater than that of the preceding year and that 1917 trade will show large gain over the preceding year. Warehouses with fabricating plants in connection are being established in leading cities.

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An earning rate of 44 per cent a share was displayed by the Morse Twist Drill & Machine Co., Bedford, Ct., in its annual report to stockholders. The report shows earnings of $868,137 on $600,000 capitalization. It was voted to increase the capitalization to $2,000,000 by issuing new stock from accumulated profits. A $50 par value of 12,000 shares was increased to $100 for 20,000 shares.

* * *

The Superior Steel Co., Carnegie, Pa., in an income report filed with the New York stock exchange shows net profits of $1,504,598 for the seven months ending Dec. 31, 1916, against $1,181,577, for the year ending May 31, 1916. Total sales for the seven months period, were $4,153,577, compared with $5,010,250, for the year ending May 31, 1916.

Boiling Increase

Wanted by Amalgamated Association —Other Scales Raised

Revised wage scales in bar iron mills for the year beginning July 1 have been completed by the wage committee of the Amalgamated Association of Iron, Steel and Tin Workers, now in annual convention at St. Louis. The new wage scale provides for an increase of 50 cents a ton for boiling up to the 1.30 cent card. The new base rate on a 1-cent card is $6 a ton. On a 1.30-cent card an increase of 15 cents; on a 1.35-cent bar iron card an increase of 10 cents and on a 1.40-cent card an increase of 5 cents a ton is wanted for boiling. No changes are proposed in the boiling rate after a 1.40-cent card is reached. Other iron mill scales provide wage increases proportionate to those asked for boiling. Many unimportant changes are made in the foot notes. Proposed scales will be considered at a joint meeting soon with manufacturers.

Bi-Monthly Settlement Gives Advances

Wages for all divisions of members of the Amalgamated Association of Iron, Steel and Tin Workers, and the Western Bar Iron Association have been substantially increased by the bi-monthly wage adjustment.

For the two months commencing May 1, boilers will be paid on a 2.45-cent card and will receive $11.80 a ton; finishing mill hands will receive a 5 per cent advance. In the sheet section a card rate of 3.90 cents gives a 15 per cent advance; while in the tin plate section the average price of $5.75 per box means a 16 per cent advance. At the previous settlement the card rate in the bar iron division was $2.35.

Labor Notes

Selden S. Deemer, vice president of the Deemer Steel Castings Co., New Castle, Del., has offered to cut up part of his farm, now in a high state of cultivation, into garden plots, 50 x 150 feet, for the free use of employes of his or of other companies. The offer already has been accepted by a number of workmen.

Although four times as many workers are employed in the factories of New York state than in building and construction work, records for the four years Oct. 1, 1910, to Sept. 30, 1914, show that more fatalities due to accidents occurred in building and construction work than in the manufacturing establishments. The comparative figures are: Building and construction work, 1,641; factories, 1,285, the latter figure including 204 fatalities resulting from three large fires.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CHARLES S. VOUGHT, who recently was appointed assistant general manager of sales of the American Steel Export Co., Woolworth building, New York, is well fitted for the duties of his new position by his many years of experience in the iron and steel industry and by his technical knowledge of export affairs. Mr. Vought was connected with the Cambria Steel Co. for eight years following four years' experience with the Fairmont Coal Co. When the original export department of the Cambria Steel Co. was formed, about three years ago three men of whom Mr. Vought was one, handled all the foreign business. The business grew so rapidly that a subsidiary company was formed which later became an independent corporation, now known as the American Steel Export Co.

Robert H. Booth, Boston, has been appointed manager of the Rowe Calk Co., Plantsville, Conn.

Thos. F. Cole, Duluth, Minn., has purchased an estate of 400 acres at Round Hill, Greenwich, Conn.

A. W. Burchard has been elected a director of the General Electric Co., Schenectady, N. Y. The directorate of the company now numbers 14.

Richard F. Grant, of M. A. Hanna & Co., Cleveland, has been elected a director of the Cleveland Trust Co., to fill a vacancy on the board.

W. L. Brown, C. T. Boynton and B. T. Bacon, of Pickands, Brown & Co., Chicago, have returned from a several weeks' stay in California.

R. C. Blankenship, formerly with the Bessie Furnace Co., New Straitsville, O., now is identified with the Pulaski Iron Co., Pulaski, Va., as blast furnace superintendent.

F. H. Schoenfuss, formerly metallurgical engineer for the Standard Roller Bearing Co., Philadelphia, has entered the field of consulting engineering and will specialize on alloy steels.

John N. Allen has been promoted from purchasing agent to traffic manager of the Brier Hill Steel Co., Youngstown, which is effective June 1. W. C. Munn, formerly assistant purchasing agent of the Youngstown Sheet & Tube Co., has been made purchasing agent; C. A. Ilgenfritz has become assistant purchasing agent and W. D. Meyers becomes general auditor, succeeding C. H. Rose, who was recently made secretary to President W. A. Thomas.

A. D. Darragh, a salesman in the Carnegie Steel Co.'s eastern branch, 30 church street, New York, reported on duty at Madison barracks, Sackett Harbor, N. Y., May 12.

H. B. Robinson, for many years superintendent of the Allentown Rolling Mills, Allentown, Pa., has entered

CHARLES S. VOUGHT

the employ of the New York Ship Building Co., Camden, N. J., as mechanical engineer, effective May 15.

C. H. Newcomb, resident manager of Crocker Bros., Pennsylvania building, Philadelphia, on May 6, won the national championship in clay target shooting at Travers Island, N. Y., with a score of 191 out of 200 possible targets.

James Bowron, president of the Gulf States Steel Co., who has been seriously ill with inflammatory rheumatism for a number of weeks, is recovering slowly and has been able to attend to some of his office duties.

Francis B. Coyle, formerly identified with the New Departure Mfg. Co., Bristol, Conn., has severed his connections with that company to accept a position with the Greenfield Tap & Die Corporation, Greenfield, Mass.

E. R. Stettinius, of J. P. Morgan & Co., has been suggested as chairman of the proposed committee made up of representatives of this country and the allies, which will succeed the Morgan firm as purchasing agent for the nations at war against Germany.

G. C. Fogwell, Philadelphia sales agent of the Jones & Laughlin Steel Co., acted as chairman of the entertainment committee in charge of the convention of the National Pipe & Supply Association held at the Bellevue-Stratford Hotel, Philadelphia, May 9 and 10.

Percy Martin, formerly of Columbus, O., has received an appointment to the British air ministry board. Mr. Martin is a director of the Daimler Motor Co., Coventry, and managing director of the British Small Arms Co., Birmingham.

T. J. Gillespie, secretary and treasurer of the Lockhart Iron & Steel Co., Pittsburgh, is an enthusiastic welfare worker. Mr. Gillespie recently offered 75 acres of land to the employes of the Lockhart company and the Pressed Steel Car Co. to encourage gardening.

W. A. Rogers, Buffalo, of Rogers, Brown & Co., who has been touring the orient for the past two months, is expected to reach Vancouver near the end of May. He has visited Shanghai, Hankow and other Chinese cities and has spent some time in Japan.

Harold Henry will sail for Japan soon, in the interests of the Allis-Chalmers Mfg. Co., Milwaukee, where he will systematize several large plants, according to American standards. This phase of work is familiar to Mr. Henry, owing to his recent experience in work of a like nature, in Russia.

Major T. O. Cole, traffic manager of the Bethlehem Steel So., South Bethlehem, Pa., and organizer of Battery A, First Pennsylvania Field Artillery, is to head a home defense battalion, which now is being organized in Bethlehem. It will comprise two companies of infantry and one machine gun corps.

George W. Knotts, Pittsburgh, has been appointed manager of the William Tod Co. and of the Lloyd Booth and Oak street shops, Youngstown, subsidiaries of the United Engineering & Foundry Co. Mr. Knotts formerly was head of the machinery department of the United Engineering & Foundry Co., Pittsburgh.

James T. McCleary, secretary of the American Iron and Steel Insti-

tute, New York, spoke on "The War and Business" before the Economic club, of Worcester, Mass., Tuesday night, May 15. Harry G. Stoddard, vice president and general manager of the Wyman-Gordon Co., is the retiring president of the club.

Shirley S. French will become assistant to W. H. Foster, president of the General Fireproofing Co., June 1, having resigned his position as manager of the Wm. Tod Co., Youngstown. Mr. French has been with the Wm. Tod Co. for the past two years. Previously he was connected with the Brier Hill Steel Co.

Alvan T. Simonds, president of the Simonds Mfg. Co., Fitchburg, Mass., maker of saws and machine knives, has resigned to accept a commission of captain in the United States army. He will be assigned to the ordnance department and will have charge of the helmet and thin armor plate during the war with headquarters in Washington.

John H. Morris has resigned as auditor of the William Tod Co., Youngstown, upon the removal of the auditing department to Pittsburgh. Previously, Mr. Morris had been for seven years with the Carnegie Steel Co., Pittsburgh. He has also been with the Republic, Iron & Steel, Inland Steel and Tennessee Coal, Coke & Railroad companies.

William A. Garrett, assistant general manager of the Remington Arms Co. plant, Eddystone, Pa., has been commissioned major of engineers in the United States army. He left for France May 12 to make a survey of railroad requirements in France and the western war theater in preparation for the dispatch of American troops to France. Major Garrett formerly was president of the Seaboard Air Line.

C. R. Richards, professor of mechanical engineering and head of the department since 1911, has been appointed dean of the college of engineering and director of the engineering experiment station of the University of Illinois to succeed Dr. W. F. M. Goss, who has resigned to become president of the Railway Car Manufacturers' Association of New York. Dean Richards is a graduate of Purdue University, 1890, and has been, successively, instructor in mechanical engineering, Colorado Agriculture College; and professor of practical mechanics, professor of mechanical engineering, and dean of the college of engineering, University of Nebraska. Since entering the University of Illinois he served for two years as acting dean of the college of engineering during an absence of Dean Goss. Dean Richards is a member of the American Society of Mechanical Engineers, Western Society of Engineers, Society for the Promotion of Engineering Education, Sigma Xi, Tau Beta Pi, Sigma Chi, and Sigma Tau.

Tool Builders

Will Discuss Papers on Timely Subjects at Cincinnati Meeting

"Elements of Cost in Machine Tool Building" will be the principal subject for discussion at the annual convention of the National Machine Tool Builders' Association, to be held in Cincinnati, O., May 21, 22 and 23. Following the registration of members on May 21, addresses will be made on the elements of cost in tool building as follows:

"Pig Iron"—James Albert Green, of Matthew Addy & Co., Cincinnati.

"Steel"—Royal Mattice, manager of sales, American Steel & Wire Co. at Cincinnati.

"Machine Shop Supplies"—W. J. Radcliffe, president E. A. Kinsey Co., Cincinnati.

"Lumber"—Col. S. B. Stansbery, Cincinnati manager Chicago Lumber & Coal Co.

"Labor" — Murray Shipley, the Lodge & Shipley Machine Tool Co., Cincinnati.

At the afternoon session, William Hard, of the Metropolitan Magazine, New York, will deliver an address on "The Lessons and Opportunities of the World's War for the American Manufacturer". He will be followed by H. W. Dunbar, of the Norton Grinder Co., Worcester, Mass., whose subject will be "Safety Devices for Machine Tools". Z. Chafee, of the Diamond Machine Co., Providence, R. I., will speak on "Trade Acceptances".

Acquires Old Stacks and Will Operate Them

J. M. Overton, president of the Alabama Fuel & Iron Co., Nashville, Tenn., through William Yule of the Pioneer Coal & Coke Co., St. Louis, has acquired the two blast furnaces of the Hillman Land & Iron Co., Grand Rivers, Ky., and will operate the two stacks as soon as repairs can be made. It is thought that repairs will have progressed so far as to permit the first stack to be blown in about July 1 on foundry iron. With the second stack operating, a combined production of about 150 tons a day is planned. Native ore, found in the locality of Grand Rivers, will be used. The stacks were built by Thomas W. Lawson, in 1891, and were sold by him, 11 years later.

Heavy Buying

Of Ammonium Sulphate at Higher Prices—Explosive Needs Uncertain

New York, May 15.—Large contracts for sulphate of ammonia for delivery over the next 12 months now are being placed. Indications are that the movement will contine over the next few weeks. The business so far closed establishes the contract market for the next 12 months at $4.40 to $4.50 per 100 pounds, at seaboard. Consumption of sulphate during the coming year will be considerably heavier than in the year just closed, due in large measure to the country-wide interest in the question of food production. At the same time the output promises to be considerably larger due to the expected increased output of by-product coke. Occasional carloads of spot sulphate of ammonia continue to be sold but there is very little

The prospect that additional buying on a large scale may develop soon from the government's high explosives requirements, continues to dominate the market in toluol and to some extent in benzol. Owing to uncertainty as to what the government will require, the producers are refusing almost all the toluol business offered. Sales this week comprised only a few drums for spot. In benzol, there have been good-sized sales spot and contract, both domestic and foreign. Both tuluol and benzol are strong. Spot toluol continues at $1.75 to $2 per gallon, and contract at $1.50 to $1.75. Pure benzol still is quoted at 55 to 60 cents per gallon, both spot and contract.

Demand for phenol continues good although not much business has been actually closed during the past week. Prices are firm at 45 cents per pound both spot contract. The situation in solvent naphtha is unchanged. This product continues to reflect the only weakness in the coal tar products market; though spot and contract buying has been improving steadily. Spot solvent naphtha is at 18 to 25 cents per gallon, and at 18 to 22 cents for contract.

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.	
Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant.	
Phenol	$0.45
Per 100 Pounds at Seaboard.	
Sulphate of ammonia	$4.75 to 4.85

Contract.

Per Gallon at Producers Plant	
Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.18 to .22
Per Pound at Producers Plant.	
Phenol (nominal)	$0.45
Per 100 Pounds at Seaboard.	
Sulphate of ammonia	$4.40 to 4.50

Dawn Breaks for Tool Builders

Period of Suspense and Inactivity Believed Over—Machines for Gun Manufacture Needed Urgently—Federal Buying Starts Slowly But Prodigiously—Ship Yards Purchase Cranes Whenever Offered

FAINT rays of daylight at last are filtering out of Washington and dispelling some of the darkness in which machinery builders have been groping. Builders have received an explicit letter of directions from the munitions board relating to the government requirements, with instructions as to what work should receive precedence. In case of conflicts between orders of similar nature, the board will decide as to which should be handled first. The government has placed orders for between 3,000 and 4,000 3 and 4-inch field guns, with manufacturers in the Chicago district, who must be equipped with special machinery. As present capacity for building such equipment is insufficient in this emergency, it is understood that at least one and probably more tool builders will undertake the production of gun-making machinery for the first time. Active inquiry is in the market from a number of smaller manufacturers who need one or two machines for government work.

Regular commercial inquiry for machine tools is reported by most dealers to have diminished considerably in the past week. Such call for equipment as has appeared before the trade has been confined mostly to inquiries for a few tools each. The General Electric Co., Schenectady, N. Y., which has been a persistent buyer of tools for months past, has closed for about 18 more machines, which do not, however, apply on the big list of general machine shop equipment it recently put before the trade. The Newport News Ship Building & Dry Dock Co., Newport News, Va., has closed for two Reed-Prentice 20-inch engine lathes. This company has decided not to take action at this time on the pipe cutting and threading machine and three drop hammers for which it recently inquired, but it may close for one or two planers soon. It also expects to award contracts for 10 electric traveling cranes within the next week.

Builders of conveying equipment report a fair inquiry, but inability to obtain deliveries inside of six months is restraining many users from closing. Probably the largest inquiry for cranes which has been issued lately is for about 30 cranes of different types for the Baltimore Dry Dock & Ship Building Co., Baltimore, in connection with the $3,000,000 expansion of this company's yard. The war department opened bids May 15 on a 15-ton 8-wheel crane for work at Highland Beach, N. J. The navy department will open bids May 28 on three revolving hammerhead electric traveling cranes for the Puget Sound navy yard. The Balbach Smelting & Refining Co., Newark, N. J., has closed for one 25-ton 8-wheel locomotive crane. The Bethlehem Steel Co. recently entered the market for a 28-ton 2-wheel locomotive crane. Thornton W. Price, engineer, 233 Broadway, New York, has taken bids on two cranes for the proposed plant of the Century Steel Co., at Poughkeepsie, N. Y. Some builders of conveying equipment state that fully 20 per cent of the capacity of their plants now is being devoted to government work.

Pittsburgh Quiets Down

MACHINE tool dealers in Pittsburgh have experienced a decided falling off in demand since May 1. This is due, it is believed, to the effects of the United States entering the war. No new inquiries for domestic delivery have come out this month, and only a few tools have been purchased for manufacturing munitions. The Carnegie Steel Co. has closed for two heavy shears for the Homestead Steel Works, Munhall, Pa. The Westinghouse Electric & Mfg. Co. continues to buy equipment for its new plant at Essington, Pa. The Cleveland Punch & Shear Works Co., Cleveland, has received an order for two light punches for the Essington plant. The Ohio Mold & Foundry Co., Cincinnati, has purchased foundry and machine shop equipment for a new ingot mold plant. The Pittsburgh Steel Products Co., which is building a seamless tube mill near Charleroi, Pa., has awarded contracts for a rather long list of tube mill equipment.

Cleveland Waits for Buying Movement

INQUIRIES have fallen off sharply in the Cleveland machine tool market. Many dealers feel that the lull precedes a heavy buying movement and are resting on their oars, content to put a few machines on sales floors in order to make immediate delivery when the rush begins. Lathes and drill presses may be had practically on call, deliveries on other tools are good and prices are unchanged. The Wells Machine & Tool Co., Cleveland, is in the market for an 18-inch lathe. The Willys-Overland Co., Toledo, O., is understood to have entered the local market for some equipment. The city of Cleveland, division of light and heat, will receive bids at the office of the commissioner of purchases and supplies, city hall, until May 29, for a locomotive crane. Specifications may be obtained by applying to room 204, city hall. The Torbenson Axle Co., East 152nd street, Cleveland, is said to have requested prices on a rather heavy list of equipment which will be purchased immediately.

Chicago Market Ebbs and Flows

CONSIDERABLE uncertainty surrounds the market for machine tools, the government's requirements not yet having been outlined. Builders are holding back until the situation is clearer. While this is a factor of restraint, the general activity in the Chicago tool market continues, Root & Vandervoort, of Moline, Ill., said to have taken a large contract for government work, have closed on their inquiry for about $300,000 worth of machine tool equipment. Delivery will be made during the present year as preferred business for government service. It is said an eastern steel company has placed orders for a heavy list of tools which will be given preferential delivery. These orders will delay shipments on private accounts.

Chicago dealers found prices too high on tools offered by the Reliance Engineering Co., Lansing, Mich., and took practically nothing. The second-hand equipment situation is top-heavy, as prices are far above original costs.

The Maxfer Truck Co. and the Drexel Engineering Co., Chicago, are buying equipment for their plants. Marshall & Huschart Machinery Co. is preparing a planer for shipment to India for the Bemis Bros. Bag Co. This tool weighs 10 tons, and the transportation charges will be at least equal to its price. Inquiry

Emergency requires Speed!

Emergencies require speed and mean extraordinary strains. No matter what the condition of the roads, the driver must take advantage of the "short cuts".

Hitting the rough spots on high is dangerous business, unless the machine is built of the right materials.

Automobile and auto truck builders realize the great importance of right materials. More and more of them are specifying "AGATHON" STEELS—especially for AXLES; CRANK SHAFTS; DRIVE SHAFTS; CONNECTING RODS; TRANSMISSION GEARS, etc.

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AGATHON STEELS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon
"AGATHON" Special Analyses

The Central Steel Company

MASSILLON, OHIO

Detroit Office: 326-27-28 Ford Building, - - - - - - - F. Walter Guibert, District Representative
Cleveland Office: Hickox Building, - - - - - - - The Hamill-Hickox Co., District Representative
Chicago Office: Room 1370 Peoples Gas Bldg., 122 South Michigan Blvd., - - A. Schaeffer, District Representative
Philadelphia Office: 902 Widener Building, - - - - - - - - Frank Wallace, District Representative
J. E. Dockendorff & Co., 20 Broad St., New York, N. Y., General Export Agents

for additional equipment for the Rock Island arsenal is expected to come out shortly. The Allsteel Equipment Co., Aurora, Ill., will build a new plant. The Charles L. Elmes Engineering Works, Chicago, will build a 4-story plant; the William D. Gibson Co., Chicago, is building an additon; the Acme Boiler & Tank Co., South Chicago, is erecting a shop; the Hoover Steel Ball Co., Detroit, is adding three buildings that will increase its capacity 60 per cent. The Great Falls Iron Works, Great Falls, Mont., is building a structural shop. The Chicago Sanitary District is about to buy a vertical hydraulic turbine and an alternating current generator for its works at Lockport. Kirksville, Mo., is planning to spend $118,000 for waterworks and electric light improvements and will install two motor-driven pumps and two oil engines and generators. Tulsa, Okla., is about to begin waterworks improvements that will cost $675,000.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

LINCOLN, ME.—Monks & Johnson have been awarded a contract for a coal handling plant by the Eastern Mfg. Co.

MILFORD, N. H.—The Milford Mfg. Co. has let the contract for a brick, mill construction, 1-story, 200 x 154-foot weave shed.

NASHUA, N. H.—The W. H. McElwain Co. has let the contract for a mill construction, 5-story, 150 x 180-foot addition to one of its factories.

ST. JOHNSBURY, VT.—A 3-story power plant, 50 x 50 feet, will be erected soon for the American Fork & Hoe Co.

BOSTON. — The Boston Wharf Co. will build a 7-story, 110 x 100 x 110-foot building in South Boston, for the Atlantic Coast Hardware Co., lessee.

BOSTON.—The General Welding & Equipment Co. has been incorporated with $50,000 capital by Thomas F. Stoddard, Adolf Krebs and Fred Joy.

BOSTON. — George W. Harvey has had plans made for a steel and brick 11-story building designed primarily for the textile trade, to have about 120,000 square feet of floor space.

BOSTON.—The Packard Motor Car Co. of Boston, has been incorporated to make motor vehicles with $1,500,000 capital, by Herbert B. Parker and Pitt W. Danforth.

CAMBRIDGE, MASS.—The oil plant of the Alden Spear's Sons Co. was damaged by fire to the extent of $30,000.

FISKDALE, MASS.—The Snell Mfg. Co. will erect a forge shop, 40 x 180 feet. F. X. Laliberte, Southbridge, has the contract.

GREENFIELD, MASS. — The Greenfield Tap & Die Corporation has let the contract for a reinforced concrete, 2-story, 100 x 100-foot storage building.

HUDSON, MASS.—The Lapointe Machine Tool Co. has let the contract for a 2-story, 40 x 100-foot addition to its main building, and a 10 x 40-foot addition to the hardening room. A 32 x 60-foot storage building will also be erected.

HUDSON, MASS.—Lawson T. Hill will build a 1-story, 340 x 42-foot factory on Central street.

HUDSON, MASS.—Ralph R. Lapointe will build a reinforced concrete, 1-story, 80 x 300-foot machine plant.

NEW BEDFORD, MASS.—The Taunton-New Bedford Copper Co. has let a contract to the J. W. Bishop Co. for a 135 x 260 rolling mill and a 118 x 257-foot machine shop, to cost $250,000. About 400 tons of steel will be required.

SOUTHBRIDGE, MASS.—Bids close May 29 for a 1-story, 50 x 74-foot post office building, to cost $62,000, for the U. S. government.

TAUNTON, MASS. — The Lincoln Twist Drill Co. has been incorporated to make tools with $1,000,000 capital by John C. Rice, Clement R. Ford and Otis T. Russell.

WARE, MASS.—The Otis Co. has let a contract for a brick, 60 x 200-foot weave shed at its plant.

WEST BRIDGEWATER, MASS.—Robert D. Alger has let a contract for a 50 x 70-foot iron foundry.

WESTFIELD, MASS.—The Vitrified Wheel Co. has been incorporated with $53,300 capi-

Government Statement Regarding Liquidated Damages

It has been found that the clause in contracts covering liquidated damages for delayed deliveries has not been operated to the advantage of the government. Even a liberal interpretation of the clause has not been understood by contractors, most of whom are still unable to understand why the government should penalize the contractor when no loss to the government has resulted from the delay in delivery. Even under the most liberal interpretations of the clause, the opinion has become firmly fixed with a large part of the commercial world that there is too much "red tape" involved, that business is not attractive to manufacturers and that the work involved in making claims for refunds, even in cases when refund is warranted, is not worth the return.

Effective immediately all contracts hereafter made by or under the cognizance of the bureau of supplies and accounts, covering materials for stock requirements, will not be subject to the clause providing for liquidated damages for delayed delivery. In all such contracts hereafter made, the clause will be ruled out of the contract prior to its being forwarded to the contractor for execution.

There remain outside of the purchases for stock many contracts covering purchases of material which, due to special needs at the time, may properly embody some provision regarding damages for delay in delivery. In such cases provision is to be made for assessing liquidated damages in such amount as will provide an effective force toward securing the delivery agreed upon. To that end the clause as now existing will continue to be applied to purchases of machinery and equipment for ships under construction at navy yards, of special apparatus, machine tools, or yard equipment, radio apparatus, aeroplane material and special ordnance materials; but in such cases consideration is to be given to an increase in the rate for each day's delay, and not to exceed 20 per cent in the aggregate.

Until requisitions already prepared or those to be prepared before May 1, 1917, have been covered by contracts and until there has been time for the establishment of a routine, special consideration will be given by purchasing officers to every purchase of material except stock materials with the view to carrying out the general principles of these instructions. All requisitions prepared after that date will bear a notation regarding the rate of liquidated damages, otherwise no provision for damages will be made in the contract.

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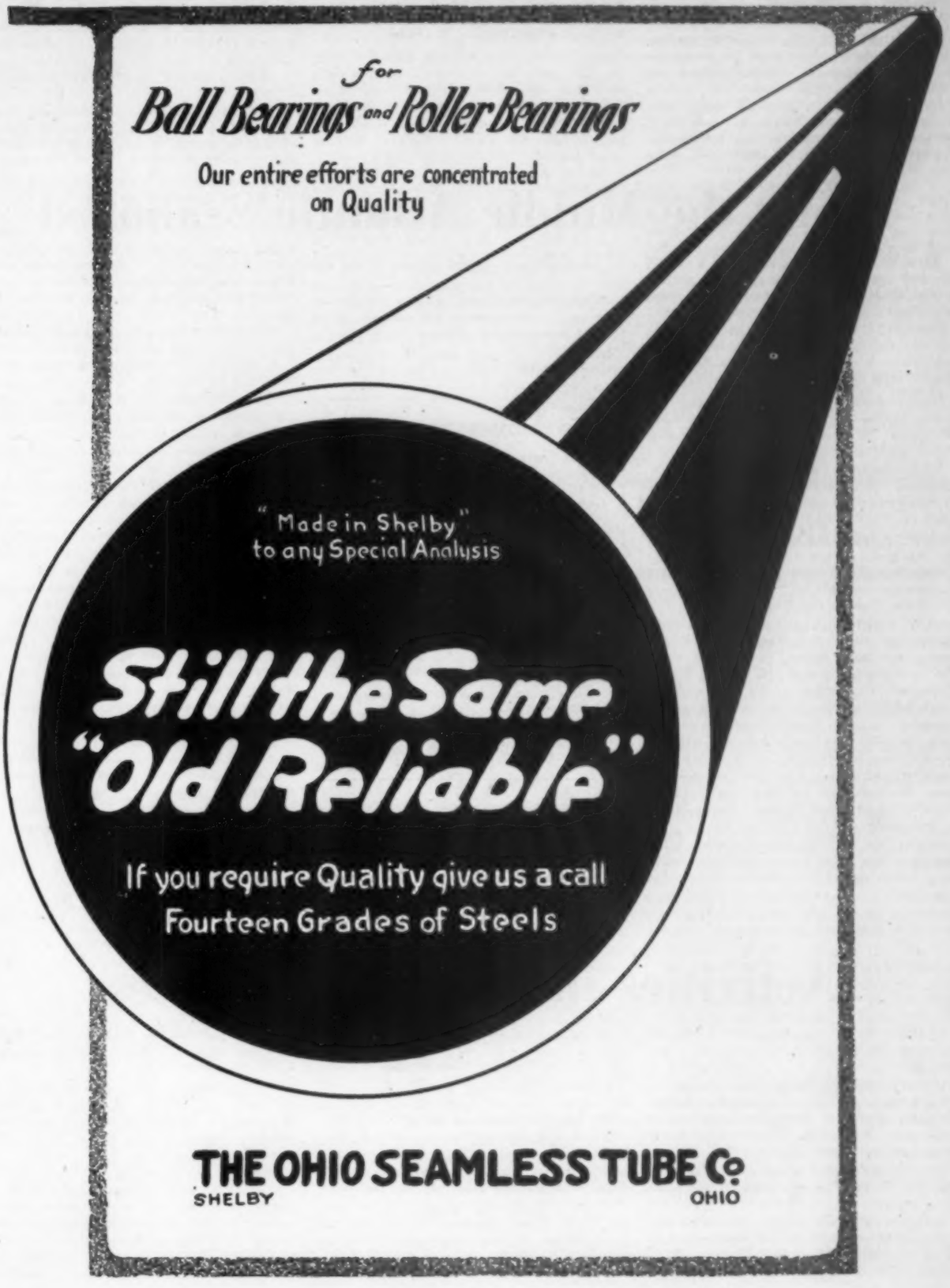
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Still the Same "Old Reliable"
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Fourteen Grades of Steels

THE OHIO SEAMLESS TUBE Co.
SHELBY OHIO

Say you saw it in THE IRON TRADE REVIEW

tal by Joseph G. Robbins, Francis R. Parks and George L. Gaylord. A 2-story, 30 x 104-foot mill is being built.

WATERTOWN, MASS.—Bids close May 23 for a brick erecting shop to cost $500,000; a brick projectile machine shop to cost $215,000 and a brick, 1½-story, 70 x 200-foot smith shop to cost $52,600 at the U. S. arsenal.

WORCESTER, MASS.—Sleeper & Hartley, Inc., is equipping a new plant, to be devoted to the manufacture of wire nail-making machinery.

CRANSTON, R. I.—Bids are being taken by the Langelier Mfg. Co. on a 2-story, 165 x 180-foot factory building, to cost $50,000.

BRIDGEPORT, CONN.—Bids have closed for a 3-story, 100 x 112-foot public welfare building to cost $150,000 for the city.

BRIDGEPORT, CONN.—The Connecticut Auto Mfg. Co. will build a 4-story factory, 70 x 128 feet.

BRISTOL, CONN.—The Clayton Mfg. Co. has been incorporated to make hardware with $100,000 capital by Oscar W. Edwards, Frederick C. Winter, William M. Bowes, Harry A. Hannum and William R. Bowes.

HARTFORD, CONN.—The Taylor & Fenn Co. has plans for a 2-story machine shop, 60 x 106 feet. Bids are being received by the architect, H. A. Woolford, West Hartford.

HARTFORD, CONN. — The Connecticut Electric Steel Co. plans to build an addition to its plant.

HARTFORD, CONN.—The Bennett Metal Treating Co. has let the general contract for a 1-story plant, 35 x 78 feet, to Bent Lane.

NAUGATUCK, CONN.—The Rubber Regenerating Co. is building a 3-story, 70 x 300-foot factory.

NEW BRITAIN, CONN.—Landers, Frary & Clark will erect a 1-story plant, 30 x 134 feet, to cost $15,000.

NEW LONDON, CONN. — Bids have closed for a 1-story, 65 x 150-foot, and a 65 x 45-foot addition to the foundry of the Standard Brass & Tube Co., to cost $35,000.

NORWALK, CONN. — Plans are being drawn for a brick, mill construction, 3-story, 90 x 250-foot addition to the factory of the Norwalk Tire & Rubber Co. in Winnipauk.

Along the Middle Atlantic Seaboard

BROOKLYN.—The Atlantic Gulf & Pacific Co. will build a 1-story shop, 60 x 140 feet, to cost $20,000. H. G. Stickle, 13 Park Row, has charge.

CATSKILL, N. Y.—The Catskill Mountain Railroad Co. has been incorporated to build and operate a narrow gage railroad, by G. H. Beach, E. E, and A. V. S. Olcott.

NEW YORK.—The Scranton Foundry & Engine Works has been organized with $100,000 capital, by W. H. Hayes, D. C. Jacobus and J. J. Fitzgerald.

NEW YORK.—The Diamond Rubber Co. has been incorporated with $200,000 capital, to manufacture rubber goods, by H. E. Raymond, F. C. Van Cleef and N. E. Oliver.

NEW YORK.—The Electrolytic Engineering Corporation will manufacture chlorine-making machinery. The company has been incorporated for $50,000, by M. Kirschberg and P. R. Gordon.

NEW YORK. — The College Point Boat Corporation, newly organized with $50,000 capital, will build boilers, engines and boats. The incorporators are H. M. Lloyd, W. H. Young and W. Remsen.

ROCHESTER, N. Y. — The Rochester Stamping Co. will build an addition to its plant, to be 2-story, 45 x 120 feet. George W. Robesson is president.

ROCHESTER, N. Y. — The North West Brass & Aluminum Co. will erect a brass foundry, 1-story, 50 x 75 feet. George Hetzler has charge.

SYRACUSE, N. Y.—Thornton W. Price, architect, New York, has preliminary plans for a rolling mill for the Hammond Steel Co.

BOSWELL, PA.—The United Coal Co., Pittsburgh, has taken over the Merchants Coal Co. Extensive improvements involving an expenditure of several million dollars are planned.

GERMANTOWN, PA. — Bids are being taken on a 2-story, brick and concrete, 60 x 325-foot manufacturing building for the American Metal Co.

HARRISBURG, PA. — Plans have been drawn for a 1-story, 40 x 80-foot producer house, for the Central Iron & Steel Co.

HOMESTEAD, PA.—The Homestead Valve Mfg. Co. has plans for a 2-story factory building, 97 x 112 feet, to cost about $60,000.

LANARCH, PA.—The Atlantic Refining Co. is having plans drawn for several additions to its plant.

Government Inquiries

The Navy Department, Bureau of Supplies and Accounts, Washington, D. C., is in the market for the following machine tools:

One 21-inch motor-driven upright drill, 1108, May 22, Philadelphia.

One 12-inch motor-driven double-head grinder, 1108, May 22, Philadelphia.

One 16-inch back-geared screw-cutting engine lathe, 1108, May 22, Philadelphia.

Four cold sawing machines, 1109, May 22, Norfolk, Va.

Two machines for spacing light angles up to 40 feet in length to gage or strip, 1107, May 22, Norfolk, Va., and Philadelphia.

One dehydrating press, 1102, May 22, Washington, D. C.

One tool room crank shaper, 1108, May 22, Philadelphia.

Schedule numbers, dates of opening of bids and place of delivery follow the specifications of the tools.

PHILADELPHIA. — A permit has been granted for the erection of a 1-story, 21 x 40-foot shop building, for the American Pulley Co.

PHILADELPHIA.—The Freund Construction Co. has been granted a permit to erect a 6-story, 42 x 150-foot manufacturing building for F. Webber.

PHILADELPHIA. — The Bernstein Mfg. Co. is about to erect an addition to its plant.

PHILADELPHIA.—The John T. Lewis Co. is taking bids on a 3-story, 42 x 204-foot plant addition.

PITTSBURGH. — The Standard Foundry Co. has been incorporated with a capital stock of $50,000; by W. C. Kenny and M. F. Christian, of New Kensington, Pa.

PITTSBURGH.—The Iron City Products Co., 1924 Farmers Bank building, has awarded D. T. Riffle a contract to erect an addition to its plant, to cost $65,000.

PITTSBURGH.—The Manchester Auto & Machine Co. plans to erect a 3-story addition, 100 x 130 feet to cost $50,000.

PITTSBURGH.—The Auto Welding & Radiator Co. has been incorporated with a capital stock of $10,000. M. H. Hartnett is treasurer of the company.

STROUDSBURG, PA. — The Universal Chain Co. has been incorporated with $50,000 capital, by Louis Daupot, et al.

TURTLE CREEK, PA.—The board of education will erect a 2-story high school, to cost $171,900. The Dawson Construction Co., Pittsburgh, has been awarded the contract.

MORRISTOWN, N. J.—The Beach Glen Mining Co. has obtained options on two properties for exploratory purposes. The company proposes to put in about ten diamond drills to make borings.

Activities in the Central States

BELOIT, WIS.—The Warner Auto Trailer Co. is in the market for metal working machinery.

FOND DU LAC, WIS.—The Chicago & North-Western railroad has awarded a contract to Gaffin & Gehri, for the construction of twenty-five steel and reinforced concrete bridges, viaducts and culverts.

MANITOWOC, WIS.—The Aluminum Castings Co., Howard Emery, manager, has plans for a foundry.

MARSHFIELD, WIS. — The Wisconsin Motor & Machinery Co. has been organized by F. C. Ritt and A. F. Gerdas and is opening a machine shop and warehouse.

MILWAUKEE.—The Davis Mfg. Co. is ready to award contracts for a foundry building, 150 x 260 feet, to cost $75,000.

MILWAUKEE.—The E. H. Karrer Co. will erect a 6-story manufacturing plant, 20 x 127 feet, to cost about $50,000.

MILWAUKEE.—The Evinrude Motor Co. has bought a site and will build a $250,000 plant. A gray iron and brass foundry in addition to a machine shop, will be included.

MILWAUKEE.—The Badger Meter Mfg. Co., J. J. Leach, president, will receive bids on a 1-story manufacturing plant, 80 x 180 feet, to cost $25,000.

RIPON, WIS.—A 1-story shop addition, 65 x 260 feet, will be erected by the Barlow & Seelig Mfg. Co. Metal working machinery will be required.

ROTHSCHILD, WIS.—The Marathon Paper Mills Co., Vaughn & Meyer, engineers, Milwaukee, is taking bids for a complete coal handling system for its power plant. The system will include a track hopper, coal crusher, belt conveyor and overhead bunkers.

WAUPUN, WIS.—Sealed bids will be received until May 15, by the public utilities commission, for all material, including wires, cables, transformers, conduit, etc., for a complete street illuminating system installed.

WAUSAU, WIS.—W. G. Kirchhoffer, con-

sulting engineer, Madison, Wis., has been engaged by the board of public works, to prepare specifications, plans and estimates for an aereating type of filtration plant for the city water works system. The work will cost about $100,000 complete.

BAY CITY, MICH.—Work has commenced on a $250,000 factory and power plant for the Wilson Body Co., Haines Wilson, president, care, Lincoln & M. C. railroad, Detroit.

DETROIT.—A contract for an 84 x 154-foot foundry building has been let to Jackson & Maurice, by the Great Lakes Engineering Works.

DETROIT.—The Economy Machine & Tool Co. has been incorporated with $10,000 capital, by W. R. Brandt, W. D. Rose and J. S. Evans.

DETROIT.—The Clay Products Co., capital $100,000, has been organized by W. S. Reynolds, James T. Alton and G. C. Tremaine.

SAGINAW, MICH.—Nelson Bros., manufacturers of gasoline engines and pumping jacks will build a two-story addition 90 x 100 feet. Cooper & Beckbissinger are architects.

ST. JOSEPH, MICH. — The Industrial Foundry Co. is building an addition 40 x 150 feet. J. Stausta is president.

AURORA, ILL.—Bids on a $50,000 manufacturing plant, 80 x 300 feet, to have two stories, are being received by Davidson & Weiss, architects. The Allsteel Equipment Co. is owner.

CHICAGO. — The Illinois Malleable Iron Co. has let a contract for a $40,000 foundry to the George Hinchliff Co., Chicago.

CHICAGO.—The General Can Co. has been incorporated with $30,000 capital by Samuel M. Hocker, Walter H. Hutch and Charles S. Williston.

CHICAGO. — The American Foundry & Equipment Co., capital $10,000, has been organized by Richard Fitzgerald, J. C. Schwartz and L. I. Bretz.

PEORIA, ILL.—Articles of incorporation have been filed by the Peoria Malleable Castings Co., capital $175,000. L. E. Roby, George T. Page and G. H. Page, are the incorporators.

GARY, IND.—The Central Metallic Door Co. will build a factory 125 x 200 feet, to cost $30,000.

INDIANAPOLIS. — The Fairbanks-Morse Electric Mfg. Co. is building an addition to cost $80,000.

MUNCIE, IND.—The Warner Gear Co., manufacturers of automobile parts, will build a factory to cost $120,000. Cune & Kibely are architects.

AKRON, O.—The Hunkin-Conkey Construction Co., Cleveland, has been awarded a contract for a 1-story power house, to be built for the Firestone Tire & Rubber Co.

CLEVELAND.—Contracts will be awarded this week by the H. M. Morse Co., architects, for a machine shop and welding plant for the Harris Calorific Co.

CLEVELAND.—Bids are being received by Franz C. Warner, architect, on a shop and office building for the Erie Dock Co., 88 x 130 feet, to cost $50,000.

CLEVELAND.—Bids are being taken by the Allen Osborn Co. on a factory building, 98 x 350 feet, to cost $80,000. A wing 45 x 83 feet will be used as a blacksmith shop.

TOLEDO, O.—A public announcement will be made soon in regard to a proposed $300,000 aeroplane factory.

TOLEDO, O. — Architects Langdon & Hohly have completed plans for a factory and store for the Western Gas Fixture Co., 60 x 110 feet, to be two stories high and to cost $35,000.

South of Mason-Dixon Line

ARLINGTON, TENN.—The city is installing a municipal light and water plant. Power for the lighting plant will be supplied by oil-burning engines. W. A. Taylor is mayor.

CHATTANOOGA, TENN.—M. B. Parker is asking for prices on a 42-inch gage, 220-volt, d. c. electric mine locomotive; second-hand in good condition.

CHATTANOOGA, TENN.—The plant of the Walsh & Weidner Boiler Co., valued at $250,000, has been badly damaged by fire. Plans are being made to rebuild the plant.

KNOXVILLE, TENN. — The Hart Mfg. Co., Grand Rapids, Mich., manufacturer of sheet metal and brass products, will remove to this city. The company has been incorporated in Tennessee with a capital of $60,000. H. M. Taylor, D. A. Isely, E. R. Taylor, et al., are the incorporators.

MEMPHIS, TENN.—The engine room of the Jorgensen-Bennett Mfg. Co. was damaged by fire recently.

CHARLESTON, S. C.—The John F. Riley Foundry & Machine Works is in the market for galvanized steel pipe.

BIRMINGHAM, ALA.—The Cambro-Clinton Mining Corporation requests prices on wrought iron pipe.

BIRMINGHAM, ALA.—The Royal Graphite Mining & Crucible Co., recently organized with $500,000 capital, will develop graphite land near Goodwater.

IRONDALE, ALA. — The Siliconite Refractories Co., capital $3,000,000, was incorporated to manufacture siliconite ore products. The officers are Robert Zell, president; J. H. Waters, vice president and J. E. Cosgrove secretary and treasurer.

MOBILE, ALA.—The Barrett Ship Building Co. will build four submarine chasers of the 110-foot, steam driven type, to cost $44,000 each, at the plant of the Henderson Iron Works.

TALLADEGA, ALA.—The Bird Coal & Iron Co., newly organized, has acquired the Talladega furnace and the Seaboard Coal & Coke Co., at Coal City. Additional equipment in the way of small machinery will be needed.

TRUSSVILLE, ALA. — The Birmingham-Trussville Iron Co., Birmingham, has been organized by E. A. Shedd, F. R. Nooman, C. C. Shedd, J. H. Adams, C. B. Shedd and D. E. Mitchell.

The Pacific Coast States

ALBERT LEA, MINN.—The Harris Knife Co., Warrensburg, Mo., will erect a 2-story shop, 32 x 60 feet, and move its plant.

NASHWAUK, MINN. — Work has commenced on an iron ore concentration plant. The owners are Butler Bros., St. Paul.

COUNCIL BLUFFS, IA.—The Chicago & North Western railroad will erect a $600,000 grain elevator. R. H. Aishton, Chicago, is president.

FREDERICKTOWN, MO.—The city plans to install a water works system to cost about $60,000.

KANSAS CITY, MO.—The American Machinery Mfg. Co. has been incorporated with $50,000 capital by J. T. Fitspatrick, Peter Martin and G. S. McLannahan.

ST. JOSEPH, MO.—The Chicago Burlington & Quincy railroad, desires bids on materials for a 2-story coaling chute, 30 x 42 feet, to cost $28,000.

ST. LOUIS.—The Exit Mfg. Co. has been incorporated with $25,000 capital to manufacture machinery by Charles W. Bardenheimer, C. C. Nichols, and M. R. Kohn.

ST. LOUIS.—The Lesser Goldman Co. will buy cotton compressor machinery involving an expenditure of $74,000.

DALLAS, TEX.—The Wyatt Metal & Boiler Works has been incorporated with $100,000 capital to build a sheet metal and boiler making plant.

KANSAS CITY, KAS.—The Standard Oil Co., H. A. Lewis, manager, is receiving bids on several buildings, involving an expenditure of $100,000.

TOPEKA, KAS.—The Kansas City-Northwestern railroad, newly organized, will build a line from Kansas City, Mo., to Beatrice, Neb.

NORFOLK, NEB. — Westover & Lindly have plans for a foundry building, to be erected as soon as a site is secured.

STANLEY, N. D.—Bids will be received until May 17 by George W. Olsod, city auditor, for a water works system.

BERTHOLD, N. D.—The city of Berthold plans to construct a water works system to cost $12,000. T. R. Arnold, Great Falls, Mont., is engineer.

OROVILLE, COL. — The Great Western Power Co. is planning to build a steel bridge over the Feather River. The office of the power company is at 14 Sansome street, San Francisco.

MISSOULA, MONT.—The Blackfoot Valley Extension of the Chicago, Milwaukee & St. Paul railroad will be extended as far as Cottonwood this year.

CALDWELL, IDA. — Walter R. Sebree, president of the Caldwell Traction Co., announces his company will bond its properties for $100,000 and spend part of this sum in electrifying the branch now operated by steam; the remainder to be spent in extending its present lines.

MARYSVALE, UTAH. — The Pittsburgh-Utah Potash Co., John Long Jr., general superintendent, will build a potash plant to cost $80,000.

SALT LAKE CITY.—The Pole Star Copper Mining Co., A. E. Custer, general manager, requests prices on compressing, hoisting and mining equipment.

SALT LAKE CITY.—The Western States Machine Co. will build a plant costing $40,000 for the manufacture of machinery. J. R. Murdock is interested.

Iron and Steel Prices

Corrected to Tuesday noon

IRON ORE

Lake Superior Ores. Lower Lake Ports.

Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bess., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores. Per unit delivered eastern Pa. All non-Bessemer.

Old Bed, crude, 58 per cent	10.50c to 11.00c
Old Bed, concent., 65 per cent	11.00c to 11.50c
Harmony concent., 63 per cent	11.50c to 11.75c
Lump (at mines)	$5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	4.50c
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c
Steel bars, New York	4.75c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	4.65c
Steel bars, St. Paul	4.60c
Steel bars, over 2-in., Buffalo	4.50c
Steel bars, Buffalo	4.40c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	4.50c
Iron bars, Detroit	4.00c
Iron bars, St. Louis	4.40c to 4.45c
Iron bars, Cincinnati	4.65c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.50c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c
Shapes, Cleveland	5.00c
Shapes, Philadelphia	4.75c to 5.00c
Shapes, Buffalo	4.60c
Shapes, Cincinnati	5.00c
Plates, Chicago	6.50c
Plates, Detroit	8.00c
Plates, St. Louis	6.55c
Plates, St. Paul	6.60c
Plates, New York	7.00c
Plates, Cleveland	7.00c
Plates, Philadelphia	7.00c
Plates, Cincinnati	7.00c
No. 10 blue anl. sheets, Chicago	7.00c
No. 10 blue anl. sheets, Clevel'd	7.50c
No. 10 blue anl. sheets, Buffalo	4.50c
No. 10 blue anl. sheets, St. L.	7.05c
No. 10 blue anl. sheets, Cincin.	7.30c
No. 10 blue anl. sheets, St. Paul	7.10c
No. 10 blue anl. sheets, Detroit	8.00c
No. 28 black sheets, Chicago	7.50c
No. 28 black sheets, Cleveland	8.00c
No. 28 black sheets, Cincinnati	7.15c
No. 28 black sheets, Detroit	8.00c
No. 28 black sheets, St. Louis	7.55c
No. 28 black sheets, St. Paul	7.60c
No. 28 galv. sheets, Chicago	9.50c
No. 28 galv. sheets, Cleveland	9.50c
No. 28 galv. sheets, Cincinnati	8.65c
No. 28 galv. sheets, Detroit	8.00c
No. 28 galv. sheets, St. Louis	10.00c
Hoops, Cleveland	5.50c
Hoops, Detroit	6.00c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$18.50 to 19.00
Bundled sheets, Cleveland	17.00 to 17.50
Bundled sheets, Buffalo	16.00 to 17.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Heavy melting steel, Pittsburgh	28.00
Heavy melting steel, Buffalo	27.00 to 28.00
Heavy melting steel, Chicago	27.50 to 28.00
Heavy melting steel, Cleveland	27.50
Heavy melting steel, Cincinnati	24.50 to 25.50
Heavy melting steel, eastern Pa.	25.00 to 26.00
Heavy melting steel, New York	22.00 to 23.00
Heavy melting steel, St. L.	29.00 to 30.00
Heavy melt'g steel, Birmingham	20.50 to 21.50
Hydraulic pressed sheets, Cleve.	21.00 to 21.50
Hydraulic pressed sheets, Pitts.	22.00 to 22.50
Hydraulic pressed sheets, Chgo.	20.00 to 20.50
Low phos. steel, Buffalo	36.00 to 38.00
Low phos. steel, Pittsburgh	37.00 to 38.00
Low phos. steel, eastern Pa.	38.00 to 40.00
Shoveling steel, Chgo.	24.50 to 25.50
Shoveling steel, St. Louis	24.00 to 24.50
Steel rails, short, Chicago	31.50 to 32.00
Steel rails, short, Cleveland	32.00 to 32.50
Steel rails, short, St. Louis	29.50 to 30.00
Steel rails, old, Birmingham	22.50 to 23.50
Stove plate, Cleveland	16.00 to 16.50
Stove plate, Cincinnati	14.25 to 14.75
Stove plate, St. Louis	15.00 to 15.50
Stove plate, N. J. points	16.50 to 17.00
Stove plate, Birmingham	13.50 to 14.50
Stove plate, Buffalo	18.00 to 18.50
Stove plate, eastern Pa.	19.00 to 19.50
Stove plate, Pittsburgh	16.00 to 17.00

(Net Tons)

Boiler plate, cut, No. 1, Chicago	18.00 to 18.50
Boiler plate, cut, No. 1, St. L.	17.00 to 17.50
Bundled sheet, Cincinnati	15.25 to 15.75
Knuckles, coup., Chicago	30.50 to 31.00
Knuckles, coup., St. Louis	28.50 to 29.00
Springs, Chicago	31.25 to 31.75
Stove plate, Chicago	14.75 to 15.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:—	
Minneapolis-St. Paul	$1.25
Mayville, Wis:—	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling No. 1, Buffalo	23.00 to 23.50
Busheling, No. 2, Buffalo	14.00 to 14.50
Busheling, No. 1, Pittsburgh	20.00 to 21.00
Cast borings, New York	13.50 to 13.75
Cast borings, eastern Pa.	16.00 to 16.50
Cast borings, Buffalo	13.00 to 13.50
Cast borings, Pittsburgh	15.25 to 15.75
City wrought, New York	26.50 to 27.00
Cut forge, Chicago	28.50 to 29.00
Forge flash'gs, un. 10 in., Cleve.	22.50
Forge flash'gs, ov. 10 in., Cleve.	20.00 to 21.00
Forge, No. 1, eastern Pa.	19.00 to 19.50
Grate bars, Buffalo	17.00 to 17.50
Grate bars, N. J. points	16.25 to 16.75
Iron axles, Pittsburgh	49.00 to 50.00
Iron axles, Cincinnati	44.00 to 45.00
Iron axles, eastern Pa.	40.00 to 42.00
Iron axles, Buffalo	45.00
Iron rails, Chicago	33.00 to 33.50
Iron rails, Buffalo	29.00 to 30.00
Iron rails, Cincinnati	28.00 to 29.00
Iron rails, St. Louis	32.50 to 33.00
Iron rails, Cleveland	32.00 to 33.00
Machine shop turnings, Buffalo	13.00 to 13.50
Mch. shop turnings, New York	12.00 to 12.50
Mach. shop turnings, Pittsburgh	14.00 to 14.50
Mch. shop turnings, eastern Pa.	15.50 to 16.00
Mch. shop turnings, Birmingham	8.50 to 9.50
R. R. and mch. cast, No. 1, Bfl.	26.00 to 26.50
R. R. wrought, No. 1, Buffalo	37.00 to 38.00
R. R. wrgt., No. 1, eastern Pa.	41.00 to 43.00
R. R. wrought, No. 1, Pittsburgh	33.00 to 36.00
R. R. wrought, No. 1, B'ham	25.00 to 26.00
Wrought pipe, Buffalo	17.00 to 17.50
Wrought pipe, eastern Pa.	23.00 to 24.00
Wrought pipe, New York	20.00 to 20.50

(Net Tons)

Angle bars, iron, Chicago	$34.25 to 34.75
Angle bars, steel, St. Louis	26.00 to 26.50
Arch bars and transoms, St. L.	35.00 to 36.00
Arch bars and transoms, Chgo.	35.00 to 35.50
Busheling, No. 1, Chicago	19.50 to 20.50
Busheling, No. 1, Cincinnati	16.50 to 17.00
Busheling, No. 1, Cleveland	20.00 to 20.50
Busheling, No. 1, St. Louis	19.50 to 20.00
Busheling, No. 2, Chicago	14.50 to 15.00
Cast borings, Cincinnati	10.00 to 10.50
Cast borings, Cleveland	12.00 to 12.25
Cast borings, St. Louis	12.00 to 12.50
Cast borings, Chicago	11.75 to 12.25
Grate bars, Cleveland	16.00 to 16.50
Iron axles, St. Louis	41.50 to 42.00
Iron axles, Chicago	42.50 to 43.00
Iron axles, Cleveland	45.00 to 46.00
Machine shop turnings, Chicago	12.00 to 12.50
Mach. shop turnings, Cleveland	11.25 to 11.75
Machine shop turn'gs, Cincinnati	10.00 to 10.50
Mach. shop turnings, St. Louis	12.50 to 13.00
Pipes and flues, Cleveland	20.00 to 21.00
Pipes and flues, Chicago	17.75 to 18.25
Pipe sand flues, St. Louis	18.50 to 19.00
Railroad wrought, No. 1, Cleve.	32.00 to 33.00
Railroad wrought, No. 1, Chgo.	31.00 to 31.50
Railroad wrought, No. 1, Cinci.	23.50 to 24.50
Railroad wrought, No. 1, St. L.	31.50 to 32.00
Railroad wrought, No. 2, Chgo.	28.50 to 29.00
Railroad wrought, No. 2, St. L.	28.00 to 28.50

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$17.50 to 18.00
Axle turnings, Buffalo	19.50 to 20.00
Shafting, New York	30.50 to 31.00
Shafting, eastern Pa.	36.00 to 37.00
Steel car axles Birmingham	35.00 to 36.00
Steel car axles, New York	42.00 to 43.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	44.00 to 45.00
Steel car axles, Pittsburgh	49.00 to 50.00
Steel car axles, eastern Pa.	41.00 to 43.00

(Net Tons)

Shafting, St. Louis	27.00 to 28.50
Steel car axles, St. Louis	42.00 to 43.00
Steel car axles, Chicago	43.00 to 44.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pittsburgh	25.00 to 25.50
Car wheels, (steel), Pittsburgh	29.00 to 30.00
Car wheels, Chicago	25.50 to 26.00
Car wheels, eastern Pa.	27.00 to 28.00
Car wheels, Buffalo	26.50 to 27.00
Car wheels, New York	21.50 to 22.50
Car wheels, St. Louis	24.50 to 25.00
Car wheels, Birmingham	20.00 to 21.00
Car wheels, Cleveland	24.50 to 25.00
Cast, No. 1, N. J. points	25.00 to 25.50
Cast, No. 1, eastern Pa.	29.00 to 30.00
Cast, No. 1, Pittsburgh	25.00 to 26.00
Cast No. 1, Cleveland	23.25 to 23.50
Cast, No. 1, Birmingham	22.00 to 23.00
Malleable railroad, Cincinnati	16.00 to 16.50
Malleable railroad, Cleveland	24.00 to 25.00
Malleable railroad, Buffalo	26.00 to 26.50
Malleable railroad, Pittsburgh	22.00 to 22.50
Malleable railroad, eastern Pa.	27.00 to 28.00
Tram car wheels, Birmingham	20.50 to 21.50

(Net Tons)

Cast, No. 1, Chicago	22.50 to 23.00
Cast, No. 1, Cincinnati	21.75 to 22.25
Cast, No. 1, St. Louis	21.50 to 22.00
Malleable railroad, Chicago	22.50 to 23.00
Malleable railroad, St. Louis	21.00 to 21.50
Malleable agricultural, Chicago	19.00 to 19.50

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	32.00 to 35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00 to 36.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00 to 35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	33.00 to 34.00
Reroll. rails, 5 ft. or ov., Birm.	30.00 to 31.00

(Net Tons)

Boiler punchings, Chicago	24.50 to 25.00
Locomotive tires, Chicago	41.00 to 41.50
Locomotive tires, St. Louis	40.00 to 41.00